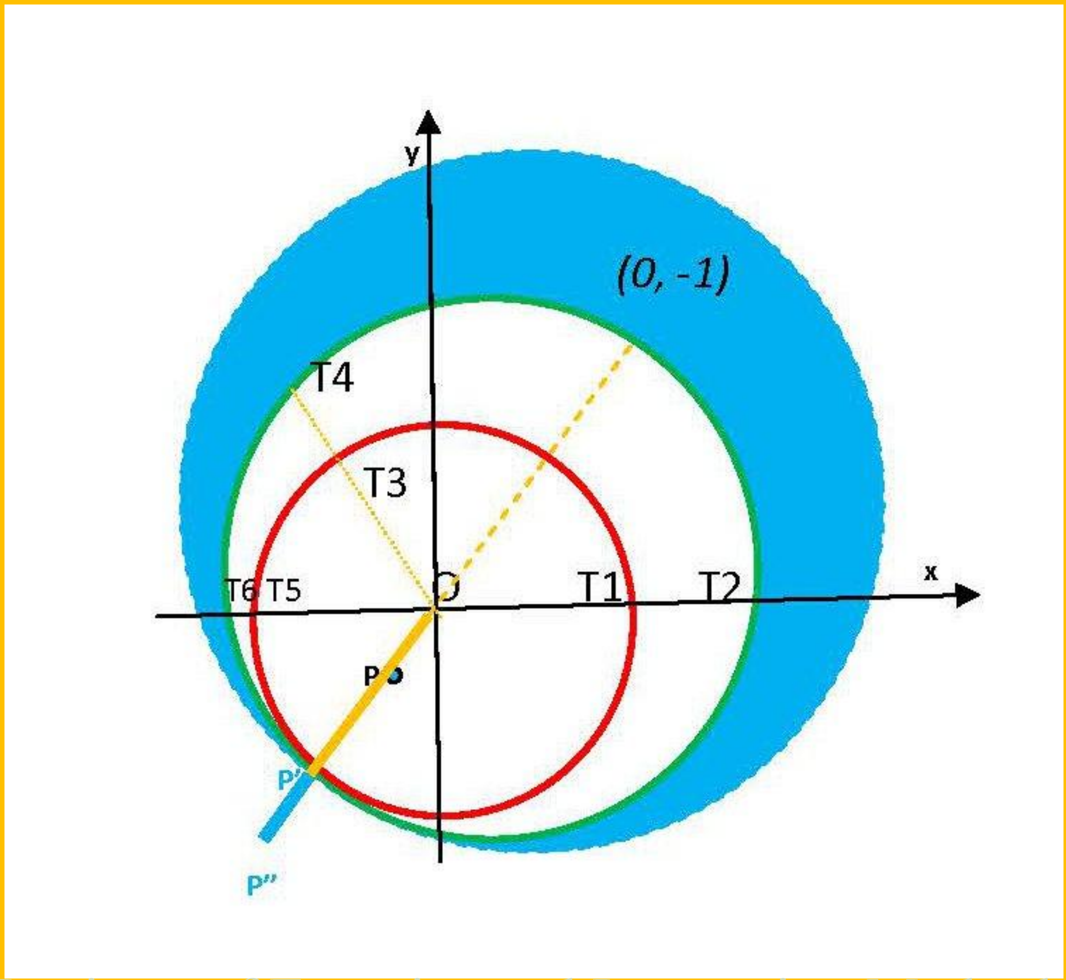
Florentin Smarandache

Extenics in Higher Dimensions



Institute of Extenics and Innovation Methods

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Extenics in Higher Dimensions

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Contribution to Extenics

Preface by Florentin Smarandache

During my research period in the Summer of 2012 at the Research Institute of Extenics and Innovation Methods, from Guangdong University of Technology, in Guangzhou, China, I have introduced the Linear and Non-Linear Attraction Point Principle and the Network of Attraction Curves, have generalized the 1D Extension Distance and the 1D Dependent Function to 2D, 3D, and in general to n-D Spaces, and have generalized Qiao-Xing Li's and Xing-Sen Li's definitions of the Location Value of a Point and the Dependent Function of a Point on a Single Finite Interval from one dimension (*1D*) to *2D, 3D*, and in general *n-D* spaces.

Then I used the Extenics, together with Victor Vlădăreanu, Mihai Liviu Smarandache, Tudor Păroiu, and Ştefan Vlăduţescu, in 2D and 3D spaces in technology, philosophy, and information theory.

Extenics is the science of solving contradictory problems in many fields set up by Prof. Cai Wen in 1983.

1. The **Linear and Non-Linear Attraction Point Principle** is the following:

Let $\mathcal{S}$ be an arbitrary set in the universe of discourse *U* of any dimension, and the optimal point $O \in \mathcal{S}$. Then each point $P(x_1, x_2, \ldots, x_n)$, $n \geq 1$, from the universe of discourse (linearly or non-linearly) tends towards, or is attracted by, the optimal point *O*, because the optimal point *O* is an ideal of each point.

There could be one or more linearly or non-linearly trajectories (curves) that the same point *P* may converge on towards *O*. Let's call all such points' trajectories as the **Network of Attraction Curves (NAC)**.

It is a king of convergence/attraction of each point towards the optimal point. There are classes of examples and applications where such attraction point principle may apply.

If this principle is good in all cases, then there is no need to take into consideration the center of symmetry of the set $\mathcal{S}$, since for example if one has a *2D* factory piece which has heterogeneous material density, then its center of weight (barycenter) is different from the center of symmetry.

1. I generalized in the track of Cai Wen's idea the extension *1D*-set to an extension *n-D*-set, and defined the Linear (or Non-Linear) **Extension *n-D*-Distance** between a point $P(x_1, x_2, \ldots, x_n)$ and the *n-D*-set $\mathcal{S}$ as $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ on the linear (or non-linear) direction determined by the point *P* and the optimal point *O* (the line *PO,* or respectively the curvilinear *PO)* in the following way:

a) $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ = the *negative distance* between *P* and the set frontier, if *P* is inside the set $\mathcal{S}$;

b) $\rho((x_1, x_2, ..., x_n), \mathcal{S}) = 0$, if P lies on the frontier of the set $\mathcal{S}$;

c) $\rho((x_1, x_2, ..., x_n), \mathcal{S})$ = the *positive distance* between P and the set frontier, if P is outside the set.

He got the following **properties** of the Extension *n-D*-Distance:

a) It is obvious from the above definition of the extension *n-D*-distance between a point P in the universe of discourse and the extension *n-D*-set $\mathcal{S}$ that:

   i) Point $P(x_1, x_2, ..., x_n) \in \text{Int}(\mathcal{S})$ iff $\rho((x_1, x_2, ..., x_n), \mathcal{S}) < 0$;

   ii) Point $P(x_1, x_2, ..., x_n) \in \text{Fr}(\mathcal{S})$ iff $\rho((x_1, x_2, ..., x_n), \mathcal{S}) = 0$;

   iii) Point $P(x_1, x_2, ..., x_n) \notin \mathcal{S}$ iff $\rho((x_1, x_2, ..., x_n), \mathcal{S}) > 0$.

b) Let $\mathcal{S}_1$ and $\mathcal{S}_2$ be two extension sets, in the universe of discourse U, such that they have no common end points, and $\mathcal{S}_1 \subset \mathcal{S}_2$. I assumed they have the same optimal points $O_1 \equiv O_2 \equiv O$ located in their center of symmetry. Then for any point $P(x_1, x_2, ..., x_n) \in U$ one has:
$\rho((x_1, x_2, ..., x_n), \mathcal{S}_1) \geq \rho((x_1, x_2, ..., x_n), \mathcal{S}_2)$.

Then I proceeded to the generalization of the dependent function from *1D*-space to Linear (or Non-Linear) *n-D*-space Dependent Function, using the previous notations.

2. The **Linear (**or **Non-Linear) Dependent *n-D*-Function** of point $P(x_1, x_2, ..., x_n)$ along the curve c, is:

$$K_{nD}(x_1, x_2, ..., x_n) = \frac{\rho_c((x_1, x_2, ..., x_n), S_2)}{\rho_c((x_1, x_2, ..., x_n), S_2) - \rho_c((x_1, x_2, ..., x_n), S_1)}$$

(where c may be a curve or even a line)

which has the following **property**:

a) If point $P(x_1, x_2, ..., x_n) \in \text{Int}(\mathcal{S}_1)$, then $K_{nD}(x_1, x_2, ..., x_n) > 1$;

b) If point $P(x_1, x_2, ..., x_n) \in \text{Fr}(\mathcal{S}_1)$, then $K_{nD}(x_1, x_2, ..., x_n) = 1$;

c) If point $P(x_1, x_2, ..., x_n) \in \text{Int}(\mathcal{S}_2 - \mathcal{S}_1)$, then $K_{nD}(x_1, x_2, ..., x_n) \in (0, 1)$;

d) If point $P(x_1, x_2, ..., x_n) \in \text{Int}(\mathcal{S}_2)$, then $K_{nD}(x_1, x_2, ..., x_n) = 0$;

e) If point $P(x_1, x_2, ..., x_n) \notin \text{Int}(\mathcal{S}_2)$, then $K_{nD}(x_1, x_2, ..., x_n) < 0$.

3. Extension Distance in 2D-Space.

Geometrically studying this extension distance, I found the following principle that Prof. Cai has used in 1983 when defining the 1D Extension Distance:

$\rho(x_0, X)$ = *the geometric distance between the point x_0 and the closest extremity point of the interval <a, b> to it (going in the direction that connects x_0 with the optimal point), distance taken as negative if $x_0 \in$ <a, b>, and as positive if $x_0 \notin$ <a, b>.*

Instead of considering a segment of line *AB* representing the interval *<a, b>* in *1R*, I considered a rectangle *AMBN* representing all points of its surface in *2D*. Similarly as for 1D-space, the rectangle in 2D-space may be closed (i.e. all points lying on its frontier belong to it), open (i.e. no point lying on its frontier belong to it), or partially closed (i.e. some points lying on its frontier belong to it, while other points lying on its frontier do not belong to it).

Let's consider two arbitrary points $A(a_1, a_2)$ and $B(b_1, b_2)$. Through the points *A* and *B* one draws parallels to the axes of the Cartesian system XY and one thus one forms a rectangle *AMBN* whose one of the diagonals is just *AB*.

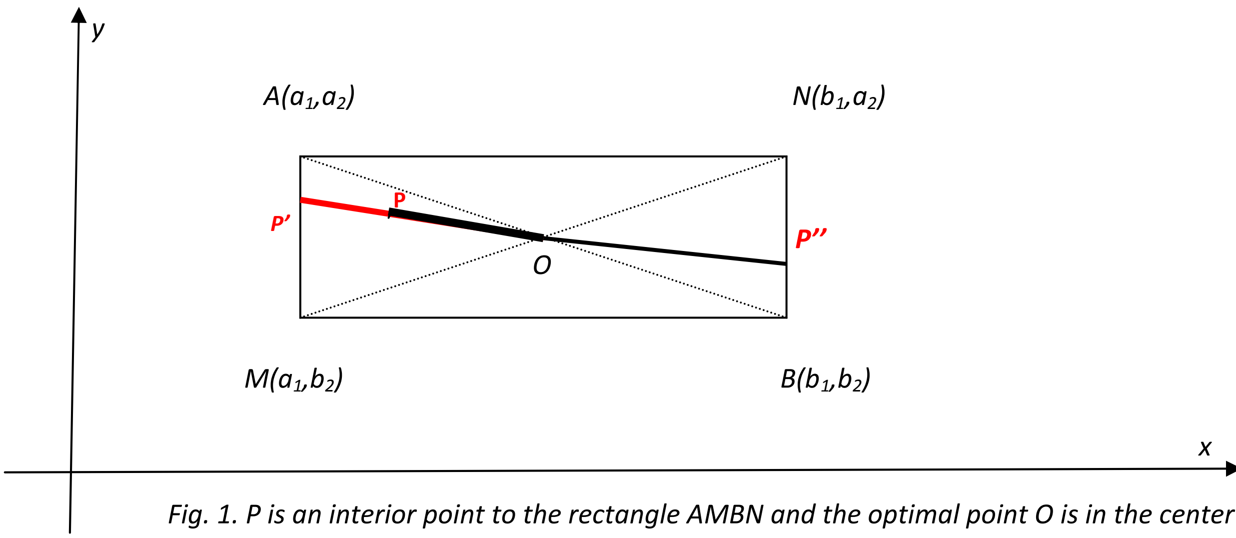

Fig. 1. P is an interior point to the rectangle AMBN and the optimal point O is in the center of symmetry of the rectangle

Let's note by *O* the midpoint of the diagonal *AB*, but *O* is also the center of symmetry (intersection of the diagonals) of the rectangle *AMBN*.
Then one computes the distance between a point $P(x_0, y_0)$ and the rectangle *AMBN*.

One can do that following the same principle as Dr. Cai Wen did:
- compute the distance in *2D* (two dimensions) between the point *P* and the center *O* of the rectangle (intersection of rectangle's diagonals);
- next compute the distance between the point *P* and the closest point (let's note it by *P'*) to it on the frontier (the rectangle's four edges), in the side of the optimal point, of the rectangle *AMBN*;

this step can be done in the following way:

considering *P'* as the intersection point between the line *PO* and the frontier of the rectangle, and taken among the intersection points that point *P'* which is the closest to *P*; this case is entirely consistent with Dr. Cai's approach in the sense that when reducing from a *2D*-space problem to two *1D*-space problems, one exactly gets his result.

The Extension *2D*-Distance, for P$\neq$O, will be:

$\rho((x_0, y_0), AMBM)$ = *d(point P, rectangle AMBN) = |PO| - |P'O|=* $\pm$ *|PP'|*

i) which is equal to the <u>negative</u> length of the red segment |PP'| in Fig. 1
when P is interior to the rectangle AMBN;
ii) or equal to <u>zero</u>
when P lies on the frontier of the rectangle AMBN (i.e. on edges AM, MB, BN, or NA) since P coincides with P';
iii) or equal to the <u>positive</u> length of the blue segment |PP'| in Fig. 2
when P is exterior to the rectangle AMBN.

where *|PO|* means the classical *2D*-distance between the point *P* and *O*, and similarly for *|P'O|* and *|PP'|*.

The Extension *2D*-Distance, for the optimal point (i.e. P=O), will be
$\rho(O, AMBM)$ = *d(point O, rectangle AMBN) = - max d(point O, point M on the frontier of AMBN).*

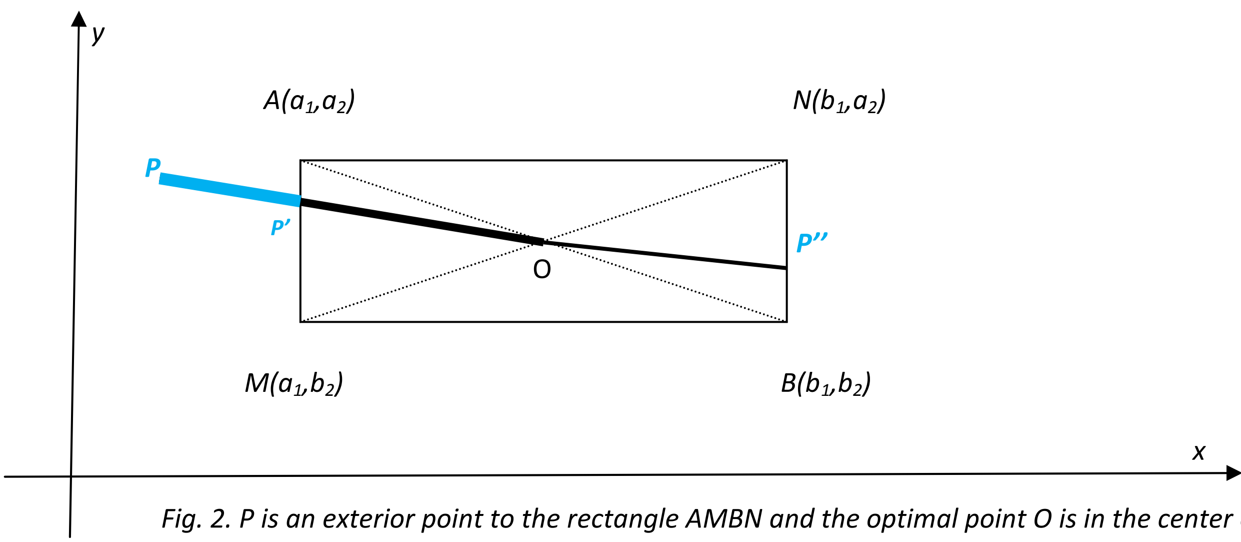

Fig. 2. P is an exterior point to the rectangle AMBN and the optimal point O is in the center of symmetry of the rectangle

4. Properties.

As for *1D*-distance, the following properties hold in *2D*:

a. Property 1.

a) (x,y)∈ Int(*AMBN) iff* $\rho((x, y), AMBN)$ *< 0, where Int(AMBN) means interior of AMBN;*

b) (x,y)∈ Fr(*AMBN) iff* $\rho((x, y), AMBN)$ *= 0, where Fr(AMBN) means frontier of AMBN;*

c) (x,y)∉ *AMBN iff* $\rho((x, y), AMBN)$ *> 0.*

b. Property 2.

Let $A_0M_0B_0N_0$ and $AMBN$ be two rectangles whose sides are parallel to the axes of the Cartesian system of coordinates, such that they have no common end points, and $A_0M_0B_0N_0 \subset AMBN$. I assumed they have the same optimal points $O_1 \equiv O_2 \equiv O$ located in the center of symmetry of the two rectangles.

Then for any point $(x, y) \in R^2$ one has $\rho((x, y), A_0M_0B_0N_0) \geq \rho((x, y), AMBN)$.

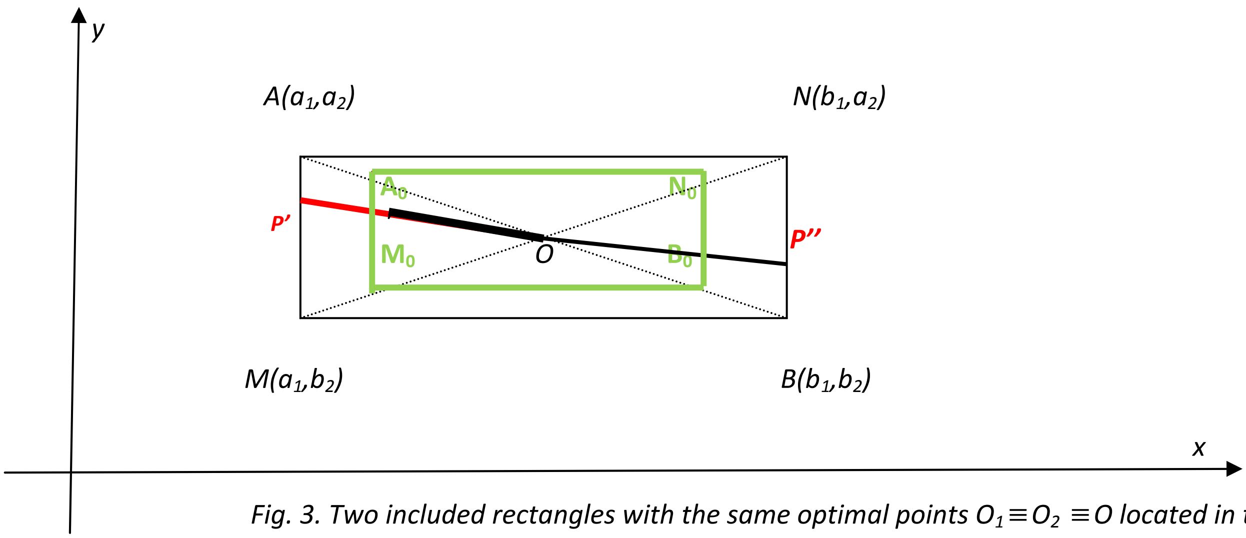

Fig. 3. Two included rectangles with the same optimal points $O_1 \equiv O_2 \equiv O$ located in their common center of symmetry

5. Dependent *2D*-Function.

Let $A_0M_0B_0N_0$ and $AMBN$ be two rectangles whose sides are parallel to the axes of the Cartesian system of coordinates, such that they have no common end points, and $A_0M_0B_0N_0 \subset AMBN$.

The **Dependent *2D*-Function** formula is:

$$K_{2D}(x, y) = \frac{\rho((x, y), AMBN)}{\rho((x, y), AMBN) - \rho((x, y), A_0M_0B_0N_0)}$$

a. Property 3.

Again, similarly to the Dependent Function in *1D*-space, one has:

a) If $(x,y) \in Int(A_0M_0B_0N_0)$, then $K_{2D}(x,y) > 1$;
b) If $(x,y) \in Fr(A_0M_0B_0N_0)$, then $K_{2D}(x,y) = 1$;
c) If $(x,y) \in Int(AMBN - A_0M_0B_0N_0)$, then $0 < K_{2D}(x,y) < 1$;
d) If $(x,y) \in Fr(AMBN)$, then $K_{2D}(x,y) = 0$;
e) If $(x,y) \notin AMBN$, then $K_{2D}(x,y) < 0$.

6. General Case in *2D*-Space.

One can replace the rectangles by any finite surfaces, bounded by closed curves in *2D*-space, and one can consider any optimal point *O* (not necessarily the symmetry center). Again, I assumed the optimal points are the same for this nest of two surfaces.

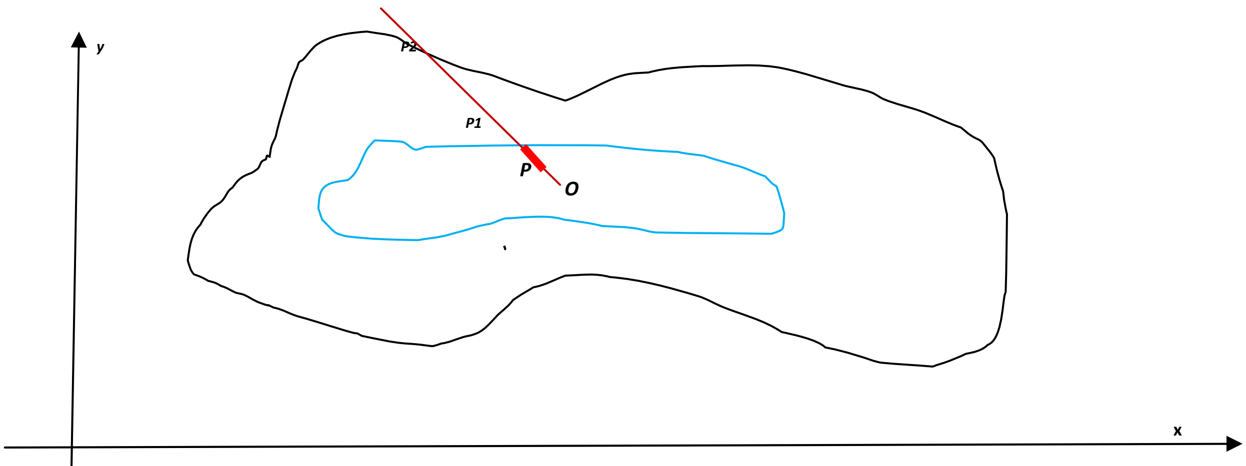

Fig. 4. Two included arbitrary bounded surfaces with the same optimal points situated in their common center of symmetry

7. Linear Attraction Point Principle.

I have introduced the Attraction Point Principle, which is the following:

Let $\mathcal{S}$ be a given set in the universe of discourse *U*, and the optimal point $O \in \mathcal{S}$. Then each point $P(x_1, x_2, \ldots, x_n)$ from the universe of discourse tends towards, or is attracted by, the optimal point *O*, because the optimal point *O* is an ideal of each point.

That's why one computes the extension *n-D*-distance between the point *P* and the set $\mathcal{S}$ as $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ on the direction determined by the point *P* and the optimal point *O*, or on the line *PO*, i.e.:

d) $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ = the *negative distance* between *P* and the set frontier, if *P* is inside the set $\mathcal{S}$;
e) $\rho((x_1, x_2, \ldots, x_n), \mathcal{S}) = 0$, if *P* lies on the frontier of the set $\mathcal{S}$;
f) $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ = the *positive distance* between *P* and the set frontier, if *P* is outside the set.

It is a king of convergence/attraction of each point towards the optimal point. There are classes of examples where such attraction point principle works.

If this principle is good in all cases, then there is no need to take into consideration the center of symmetry of the set $\mathcal{S}$, since for example if one has a *2D* piece which has heterogeneous material density, then its center of weight (barycenter) is different from the center of symmetry.

Let's see below such example in the *2D*-space:

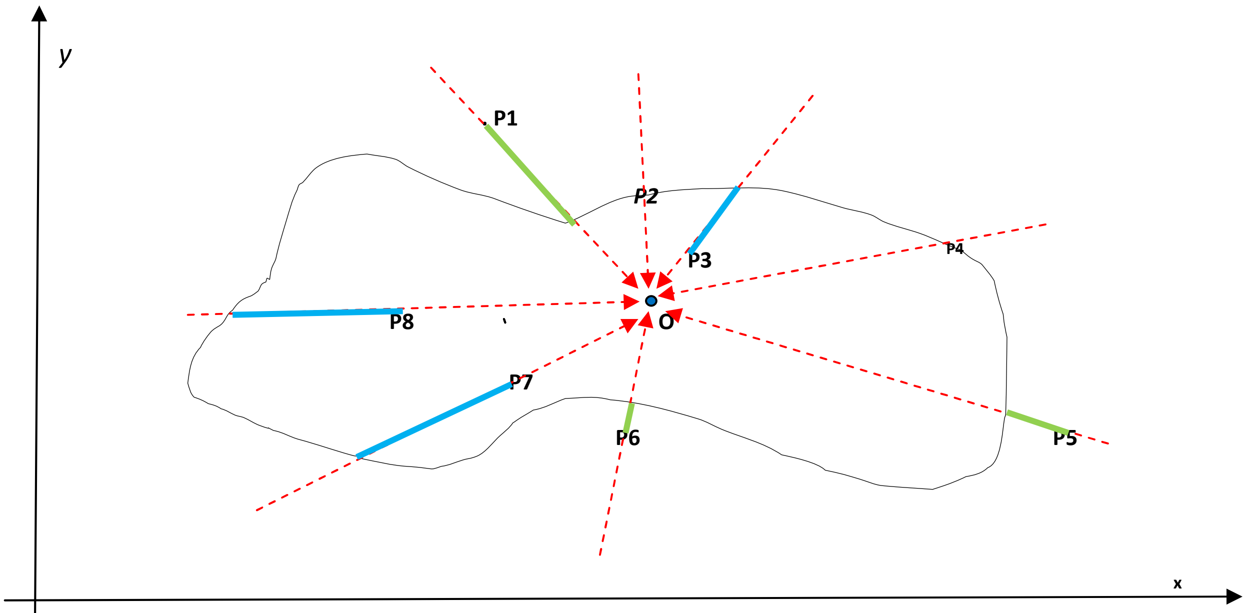

Fig. 5. The optimal point O as an attraction point for all other points P_1, P_2, …, P_8 in the universe of discourse R^2

8. Extension Distance in *3D-Space*.

I further generalized to *3D*-space the Extension Set and the Dependent Function. Assume one has two points *A(a1, a2, a3)* and *B(b1, b2, b3)* in *3D*. Drawing through *A* and *B* parallel planes to the planes' axes *(XY, XZ, YZ)* in the Cartesian system *XYZ* I get a prism $AM_1M_2M_3BN_1N_2N_3$ (with eight vertices) whose one of the transversal diagonals is just the line segment *AB*. Let's note by *O* the midpoint of the transverse diagonal *AB*, but *O* is also the center of symmetry of the prism.

Therefore, from the line segment *AB* in *1D*-space, to a rectangle *AMBN* in *2D*-space, and now to a prism $AM_1M_2M_3BN_1N_2N_3$ in *3D*-space. Similarly to 1D- and 2D-space, the prism may be closed (i.e. all points lying on its frontier belong to it), open (i.e. no point lying on its frontier belong to it), or partially closed (i.e. some points lying on its frontier belong to it, while other points lying on its frontier do not belong to it).

Then one computes the distance between a point $P(x_0, y_0, z_0)$ and the prism $AM_1M_2M_3BN_1N_2N_3$.

One can do that following the same principle as Dr. Cai's:
- compute the distance in *3D* (two dimensions) between the point *P* and the center *O* of the prism (intersection of prism's transverse diagonals);
- next compute the distance between the point *P* and the closest point (let's note it by *P'*) to it on the frontier (the prism's lateral surface) of the prism $AM_1M_2M_3BN_1N_2N_3$;

considering P' as the intersection point between the line *OP* and the frontier of the prism, and taken among the intersection points that point *P'* which is the closest to *P*; this case is entirely consistent with

Dr. Cai's approach in the sense that when reducing from *3D*-space to *1D*-space one gets exactly Dr. Cai's result;

- the Extension *3D*-Distance will be: $d(P, AM_1M_2M_3BN_1N_2N_3) = |PO| - |P'O| = \pm |PP'|$, where $|PO|$ means the classical distance in *3D*-space between the point *P* and *O*, and similarly for $|P'O|$ and $|PP'|$.

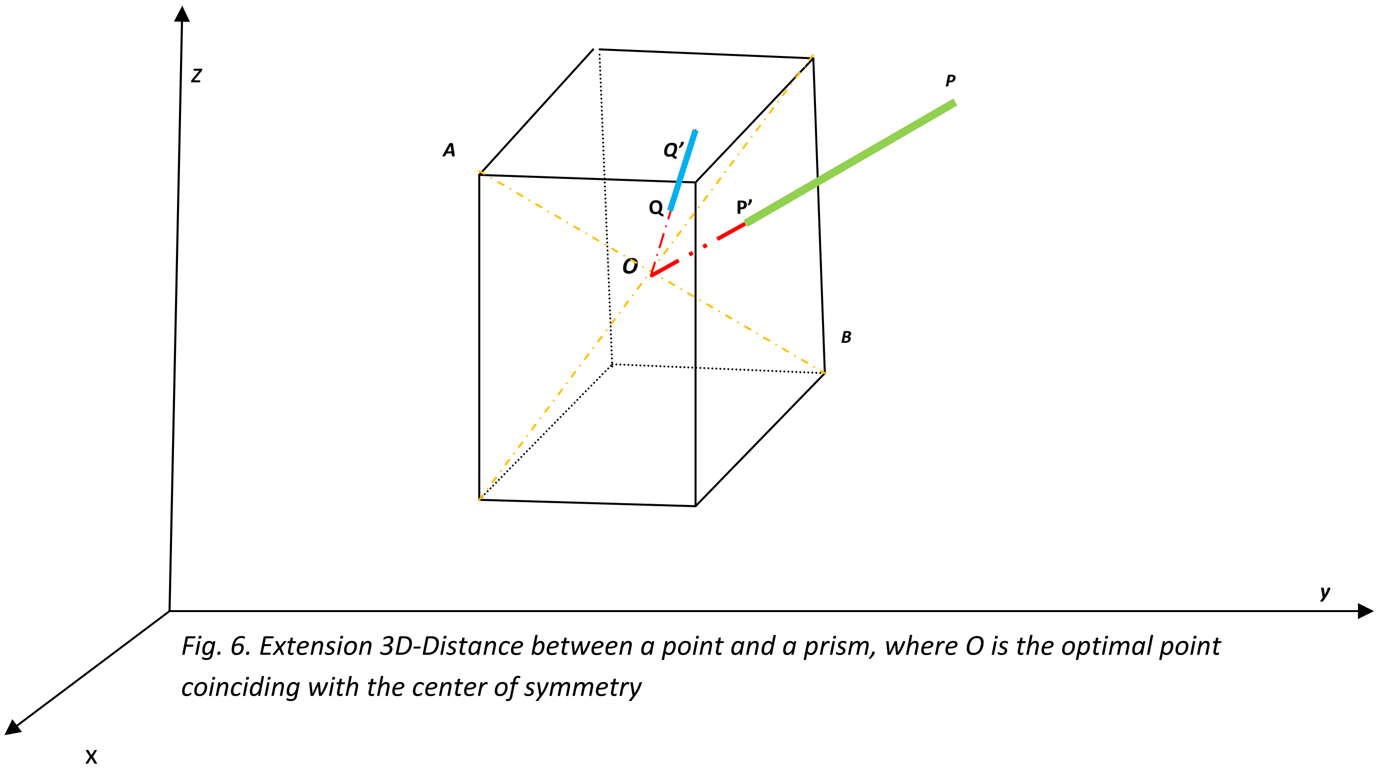

Fig. 6. Extension 3D-Distance between a point and a prism, where O is the optimal point coinciding with the center of symmetry

9. Property 4.

a) $(x,y,z) \in Int(AM_1M_2M_3BN_1N_2N_3)$ *iff* $\rho((x,y,z), AM_1M_2M_3BN_1N_2N_3) < 0$, *where* $Int(AM_1M_2M_3BN_1N_2N_3)$ *means interior of* $AM_1M_2M_3BN_1N_2N_3$;

b) $(x,y,z) \in Fr(AM_1M_2M_3BN_1N_2N_3)$ *iff* $\rho((x,y,z), AM_1M_2M_3BN_1N_2N_3) = 0$, *where* $Fr(AM_1M_2M_3BN_1N_2N_3)$ *means frontier of* $AM_1M_2M_3BN_1N_2N_3$;

c) $(x,y,z) \notin AM_1M_2M_3BN_1N_2N_3$ *iff* $\rho((x,y,z), AM_1M_2M_3BN_1N_2N_3) > 0$.

10. Property 5.

Let $A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03}$ and $AM_1M_2M_3BN_1N_2N_3$ be two prisms whose sides are parallel to the axes of the Cartesian system of coordinates, such that they have no common end points, and $A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03} \subset AM_1M_2M_3BN_1N_2N_3$. I assumed they have the same optimal points $O_1 \equiv O_2 \equiv O$ located in the center of symmetry of the two prisms.

Then for any point $(x,y,z) \in R^3$ *one has*

$$\rho((x,y,z), A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03}) \geq \rho((x,y,z), AM_1M_2M_3BN_1N_2N_3).$$

11. The Dependent *3D*-Function.

The last step is to devise the Dependent Function in *3D*-space similarly to Dr. Cai's definition of the dependent function in *1D*-space.
Let $A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03}$ and $AM_1M_2M_3BN_1N_2N_3$ be two prisms whose faces are parallel to the axes of the Cartesian system of coordinates *XYZ*, such that they have no common end points, such that $A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03} \subset AM_1M_2M_3BN_1N_2N_3$. I assume they have the same optimal points $O_1 \equiv O_2 \equiv O$ located in the center of symmetry of these two prisms.

The **Dependent *3D*-Function** formula is:

$$K_{3D}(x,y,z) = \frac{\rho((x,y,z), AM_1M_2M_3BN_1N_2N_3)}{\rho((x,y,z), AM_1M_2M_3BN_1N_2N_3) - \rho((x,y,z), A_0M_{01}M_{02}M_{03}BN_{01}N_{02}N_{03})}$$

12. Property 6.

Again, similarly to the Dependent Function in *1D*- and *2D*-spaces, one has:

f) If $(x,y,z) \in Int(A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03})$, then $K_{3D}(x,y,z) > 1$;
g) If $(x,y,z) \in Fr(A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03})$, then $K_{3D}(x,y,z) = 1$;
h) If $(x,y,z) \in Int(AM_1M_2M_3BN_1N_2N_3 - A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03})$, then $0 < K_{3D}(x,y,z) < 1$;
i) If $(x,y,z) \in Fr(AM_1M_2M_3BN_1N_2N_3)$, then $K_{3D}(x,y,z) = 0$;
j) If $(x,y,z) \notin AM_1M_2M_3BN_1N_2N_3$, then $K_{3D}(x,y,z) < 0$.

13. General Case in *3D*-Space.

One can replace the prisms by any finite *3D*-bodies, bounded by closed surfaces, and one considers any optimal point *O* (not necessarily the centers of surfaces' symmetry). Again, I assumed the optimal points are the same for this nest of two *3D*-bodies.

14. Remark 2.

Another possible way, for computing the distance between the point *P* and the closest point *P'* to it on the frontier (lateral surface) of the prism $AM_1M_2M_3BN_1N_2N_3$ is by drawing a perpendicular (or a geodesic) from *P* onto the closest prism's face, and denoting by P' the intersection between the perpendicular (geodesic) and the prism's face.

And similarly if one has an arbitrary finite body $\mathcal{B}$ in the *3D*-space, bounded by surfaces. One computes as in classical mathematics:

$$d(P, \mathcal{B}) = \inf_{Q \in B} |PQ|$$

15. Linear Attraction Point Principle in 3D-Space.

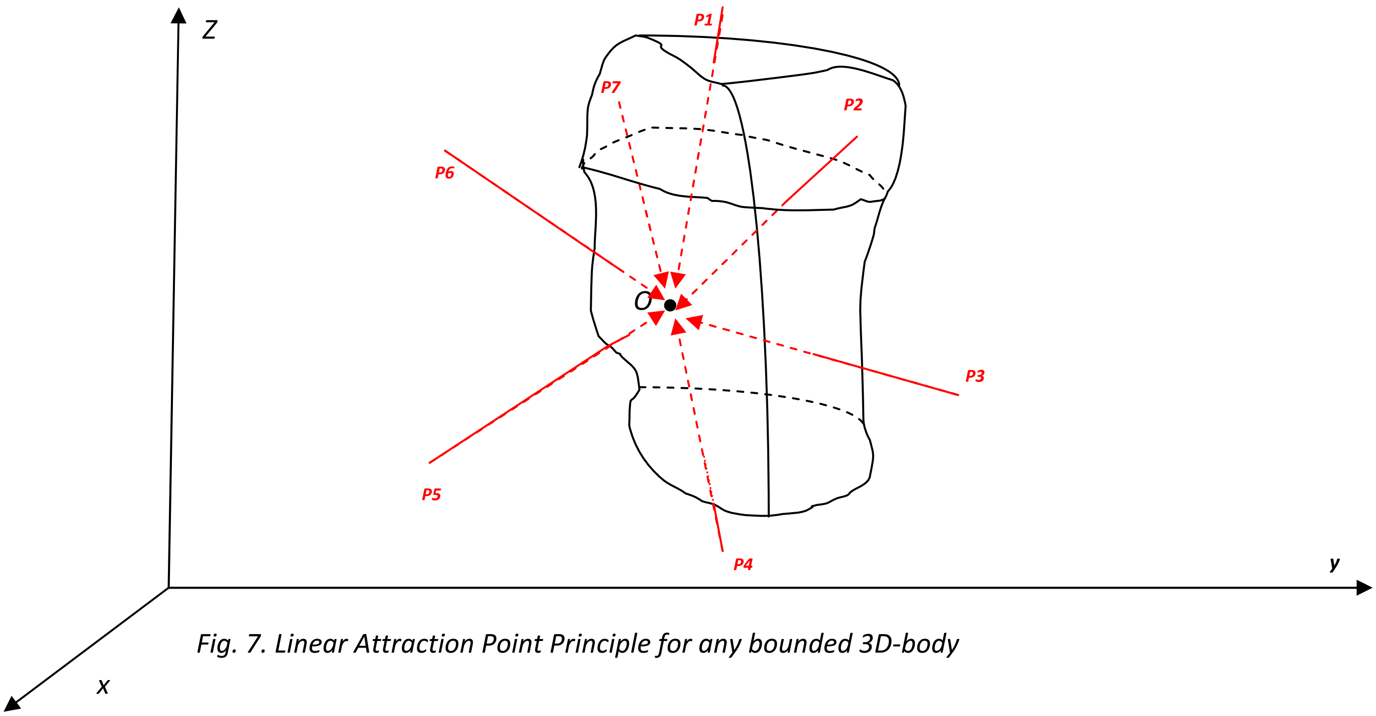

Fig. 7. Linear Attraction Point Principle for any bounded 3D-body

16. Non-Linear Attraction Point Principle in 3D-Space (and in n-D-Space).

There might be spaces where the attraction phenomena undergo not linearly by upon some specific non-linear curves. Let's see below such example for points P_i whose trajectories of attraction towards the optimal point follow some non-linear *3D*-curves.

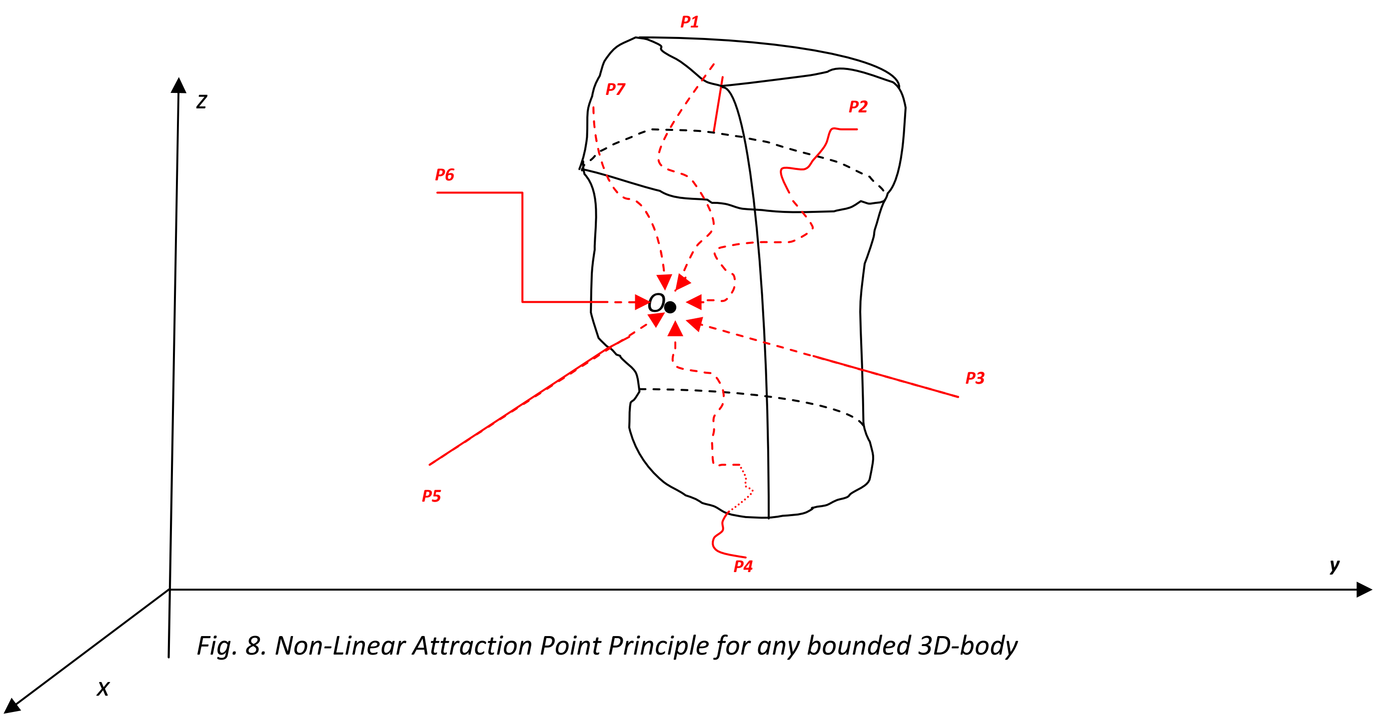

Fig. 8. Non-Linear Attraction Point Principle for any bounded 3D-body

17. n-D-Space.

In general, in a universe of discourse *U*, let's have an *n-D*-set $\mathcal{S}$ and a point *P*.
Then the **Extension Linear *n-D*-Distance** between point *P* and set $\mathcal{S}$, is:

$$\rho(P,S)=\begin{cases} \underset{P'\in Fr(S)}{-d(P,P')}, & P\neq O, P\in|OP'|; \\ \underset{P'\in Fr(S)}{d(P,P')}, & P\neq O, P'\in|OP|; \\ -\underset{M\in Fr(S)}{\max} d(P,M), & P=O. \end{cases}$$

where *O* is the optimal point (or linearly attraction point);
d(P,P') means the classical linearly *n-D*-distance between two points *P* and *P'*;
Fr($\mathcal{S}$*)* means the frontier of set $\mathcal{S}$;
and *|OP'|* means the line segment between the points *O* and *P'* (the extremity points *O* and *P'* included), therefore *P*∈ *|OP'|* means that *P* lies on the line *OP'*, in between the points *O* and *P'*.
For *P* coinciding with *O*, one defined the distance between the optimal point *O* and the set $\mathcal{S}$ as the negatively maximum distance (to be in concordance with the *1D*-definition).

And the **Extension Non-Linear *n-D*-Distance** between point *P* and set $\mathcal{S}$, is:

$$\rho_c(P,S)=\begin{cases} \underset{P'\in Fr(S)}{-d_c(P,P')}, & P\neq O, P\in c(OP'); \\ \underset{P'\in Fr(S)}{d_c(P,P')}, & P\neq O, P'\in c(OP); \\ -\underset{M\in Fr(S), M\in c(O)}{\max} d_c(P,M), & P=O. \end{cases}$$

where $\rho_c(P,S)$ means the extension distance as measured along the curve *c*;
O is the optimal point (or non-linearly attraction point);
the points are attracting by the optimal point on trajectories described by an injective curve *c*;
$d_c(P,P')$ means the non-linearly *n-D*-distance between two points *P* and *P',* or the arclength of the curve *c* between the points *P* and *P'*;
Fr($\mathcal{S}$*)* means the frontier of set $\mathcal{S}$;
and c(*OP')* means the curve segment between the points *O* and *P'* (the extremity points *O* and *P'* included), therefore *P*∈ *c(OP')* means that *P* lies on the curve *c* in between the points *O* and *P'*.
For *P* coinciding with *O*, one defined the distance between the optimal point *O* and the set $\mathcal{S}$ as the negatively maximum curvilinear distance (to be in concordance with the *1D*-definition).

In general, in a universe of discourse *U*, let's have a nest of two *n-D*-sets, $\mathcal{S}_1 \subset \mathcal{S}_2$, with no common end points, and a point *P*.
Then the **Extension Linear Dependent *n-D*-Function** referring to the point $P(x_1, x_2, \ldots, x_n)$ is:

$$K_{nD}(P) = \frac{\rho(P, S_2)}{\rho(P, S_2) - \rho(P, S_1)}$$

where $\rho(P, S_2)$ is the previous extension linear n-D-distance between the point *P* and the *n-D*-set S_2.

And the **Extension Non-Linear Dependent n-D-Function** referring to point $P(x_1, x_2, \ldots, x_n)$ along the curve *c* is:

$$K_{nD}(P) = \frac{\rho_c(P, S_2)}{\rho_c(P, S_2) - \rho_c(P, S_1)}$$

where $\rho_c(P, S_2)$ is the previous extension non-linear n-D-distance between the point *P* and the *n-D*-set S_2 along the curve *c*.

18. Remark 3.

Particular cases of curves *c* could be interesting to studying, for example if *c* are parabolas, or have elliptic forms, or arcs of circle, etc. Especially considering the geodesics would be for many practical applications.

Tremendous number of applications of Extenics could follow in all domains where attraction points would exist; these attraction points could be in physics (for example, the earth center is an attraction point), economics (attraction towards a specific product), sociology (for example attraction towards a specific life style), etc.

19. **Location Value of a Point and the Dependent Function on a Single Finite Interval (on 1D-Space)**.

Suppose $S = <a, b>$ is a finite interval. By the notation $<a, b>$ one understands any type of interval: open (a, b), closed $[a, b]$, or semi-open/semi-closed $(a, b]$ and $[a, b)$.

a) For any real point $x_0 \in R$, Qiao-Xing Li and Xing-Sen Li have considered

$$D(x_0, S) = a-b$$

as the <u>location value</u> of point $P(x_0)$ on the single finite interval $<a, b>$.
Of course $D(x_0, S) = D(P, S) < 0$, since $a < b$.
As we can see, $a-b$ is the negative distance between the frontiers of the single finite interval S in the $1D$-space.

b) Afterwards, the above authors defined for any real point $P(x_0)$, with $x_0 \in S$, the elementary dependent function on the single interval S in the following way:

$$k(x_0) = \frac{\rho(x_0, S)}{D(x_0, S)}$$

where $\rho(x_0, S)$ is the extension distance between point x_0 and the finite interval X in the *1D*-space. Or we can re-write the above formula as:

$$k(P) = \frac{\rho(P,S)}{D(P,S)}.$$

20. **Generalizations of the Location Value of a Point and the Dependent Function on a Single Finite Set on the n-D-Space**.

In general, in a universe of discourse *U*, let's have an *n-D*-set *S* and a point $P \in U$.

a) The **Generalized Location Value of Point *P* on the Single Finite Set *S* in *n-D* Space,** $D_{nD}(x_0, S)$, is the classical geometric distance (yet taken with a negative sign in front of it) between the set frontiers, distance taken on the line (or in general taken on the curve or geodesic) passing through the optimal point *O* and the given point *P*.
In there are many distinct curves passing through both *O* and *P* in the Network of Attraction Curves, then one takes that curve for which one gets the maximum geometric distance (and one assigns a negative sign in front of this distance).
We can also denote it as $D_{nD}(P, S)$.

Thus we have defined the **Generalized Extension Linear/Non-Linear *n-D*-Distance** between point *P* and set *S*, considering non-unique curves, as:

$$\rho_{nD}(P,S) = \begin{cases} -\max\limits_{c \in NAC} \underset{P' \in Fr(S)}{d}(P,P';c), & P \neq O, P \in c(OP'); \\ \max\limits_{\substack{c \in NAC \\ P' \in Fr(S)}} d(P,P';c), & P \neq O, P' \in c(OP); \\ -\max\limits_{c \in NAC, M \in Fr(S), M \in c(O)} d(P,M;c), & P=O. \end{cases}$$

where $\rho_{nD}(P,S)$ means the extension distance as measured along the curve *c* in the *n-D* space;
O is the optimal point (or non-linearly attraction point);
the points are attracting by the optimal point *O* on trajectories described by an injective curve *c*;
d(P,P';c) means the non-linearly *n-D*-distance between two points *P* and *P'* along the curve *c*, or the arclength of the curve *c* between the points *P* and *P'*;
Fr(S) means the frontier of set *S*;
and c(*OP')* means the curve segment between the points *O* and *P'* (the extremity points *O* and *P'* included), therefore $P \in c(OP')$ means that *P* lies on the curve *c* in between the points *O* and *P'*.
For *P* coinciding with *O*, one defined the distance between the optimal point *O* and the set *S* as the negatively maximum curvilinear distance (to be in concordance with the *1D*-definition).
In the same way, if there are many curves, *c* in the Network of Attraction Curves, passing through both *O* and *P,* then one chooses that curve which maximizes the geometric distance.

We do these maximizations in order to be consistent with the case when the point *P* coincides with the optimal point *O*.

We now proceed to defining the **Generalized Dependent Function on a Single Finite Set** *S* **in *n-D*-Space of Point *P***, considering non-unique curves:

$$k_{nD}(P) = \max_{c \in NAC} \frac{\rho_{nD}(P,S;c)}{D_{nD}(P,S;c)}$$

or using words: the Generalized Dependent Function on a Single Finite Set *S* of point *P* is the geometric distance between point *P* and the closest frontier on the line (or in general on the curve/geodesic c that connects *P* with the optimal point *O)* in the same side of the optimal point, divided by the distance [taken along the line (or in general on the curve/geodesic c that connects P with the optimal point *O*)] between the set frontiers.

If there are more curves passing through *P* and *O*, then one takes that curve which maximizes the value of $k_{nD}(P)$.

21. **Examples of 2D-Dependent Function on a Single Finite Set**.

Let's retake a previous example with two rectangles, $A_0M_0B_0N_0$ and *AMBN,* whose sides are parallel to the axes of the Cartesian system of coordinates, such that they have no common end points, and $A_0M_0B_0N_0 \subset AMBN$. The optimal point is *O* located in their center of symmetry.

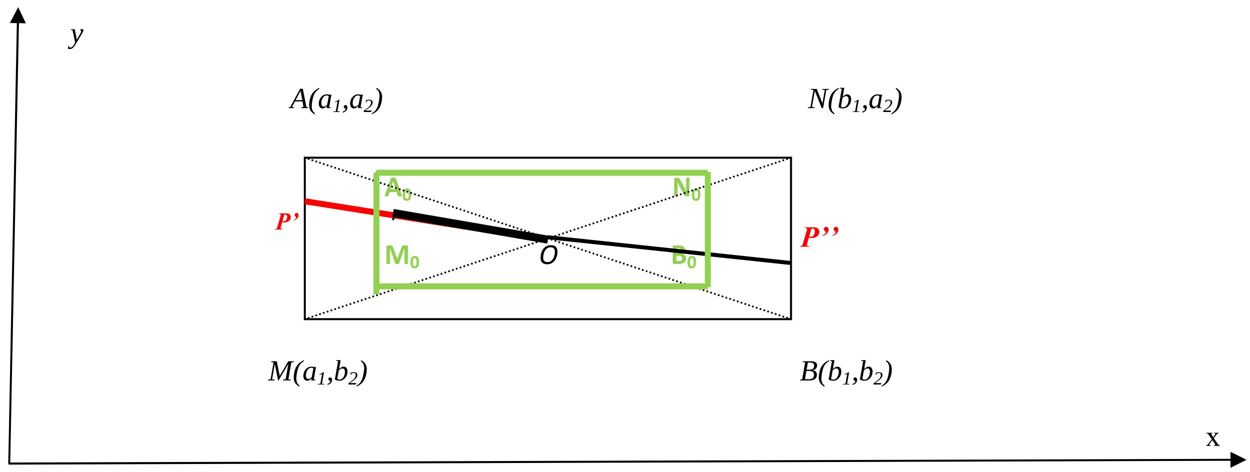

Fig. 9. The small rectangle shrinks until it vanishes.

If there is only a single finite set *AMBN*, this means that the other set $A_0M_0B_0N_0$ (which is included in *AMBN*) is shrinking little by little until it vanishing, thus the *(0, 1)* value of the dependent function of two nested sets increases until occupying the whole interior of the big set *AMBN*:

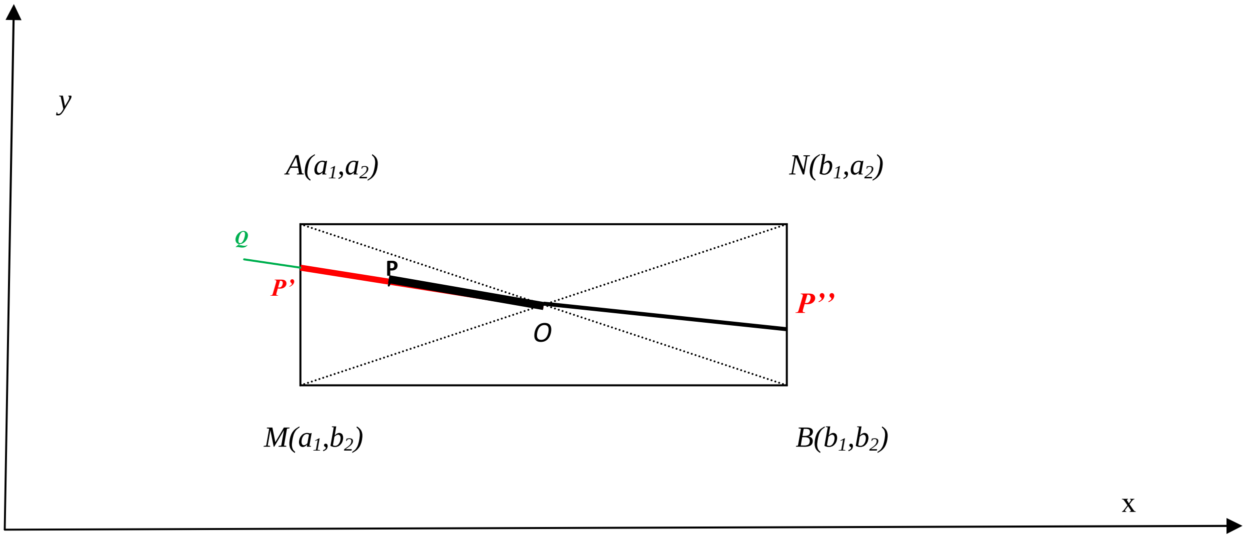

Fig. 10. The Dependent Function of a Point on a Single Rectangle.

The dependent function of interior point *P* with respect to the single rectangle *AMBN* is:

$$k(P) = +\frac{|PP'|}{|P''P'|}$$

i.e. the distance between P and the closest frontier of the rectangle *{ =|PP'| }*, divided by the distance between the frontiers of the rectangle *{ =|P''P| }.*

The dependent function of exterior point *Q* with respect to the single rectangle *AMBN* is:

$$k(Q) = -\frac{|QP'|}{|P''P'|}.$$

And the dependent function of frontier point *P'* with respect to the single rectangle *AMBN* is:

$$k(P') = \frac{|P'P'|}{|P''P'|} = 0.$$

In this example we have considered only one curve of convergence for each point in the Network of Attraction Curves.

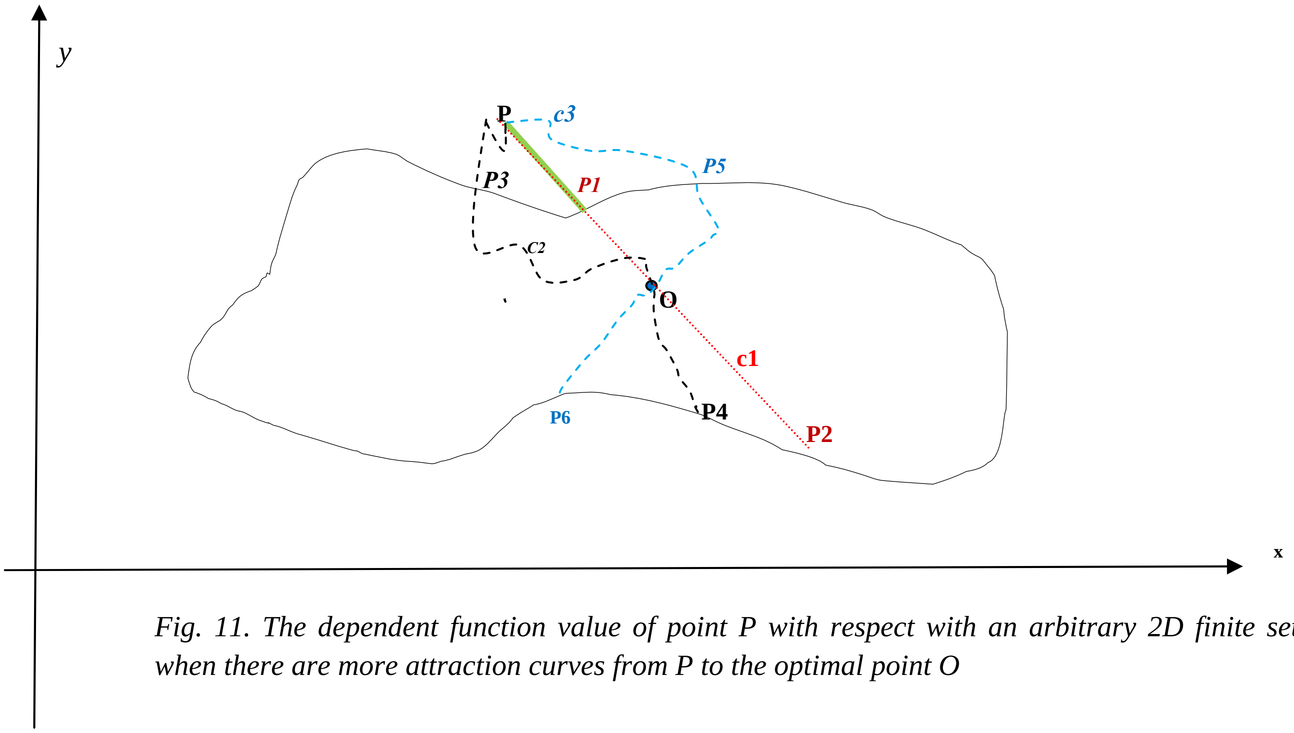

Fig. 11. The dependent function value of point P with respect with an arbitrary 2D finite set, when there are more attraction curves from P to the optimal point O

The dependent function value of point *P* is:

$$k(P) = -\max\{\frac{c1(PP1)}{c1(P1P2)} = \frac{|PP1|}{|P1P2|}, \frac{c2(PP3)}{|c2(P3P4)}, \frac{c3(PP5)}{c3(P5P6)}\}$$

where *c1(PP1)* means the arclength between the points *P* and *P1* on the curve *c1* (which happens in this case to be just a line segment), and similarly *c2(.,.)* and *c3(.,.)*.

22. **Example of 3D-Dependent Function on a Single Finite Set**.

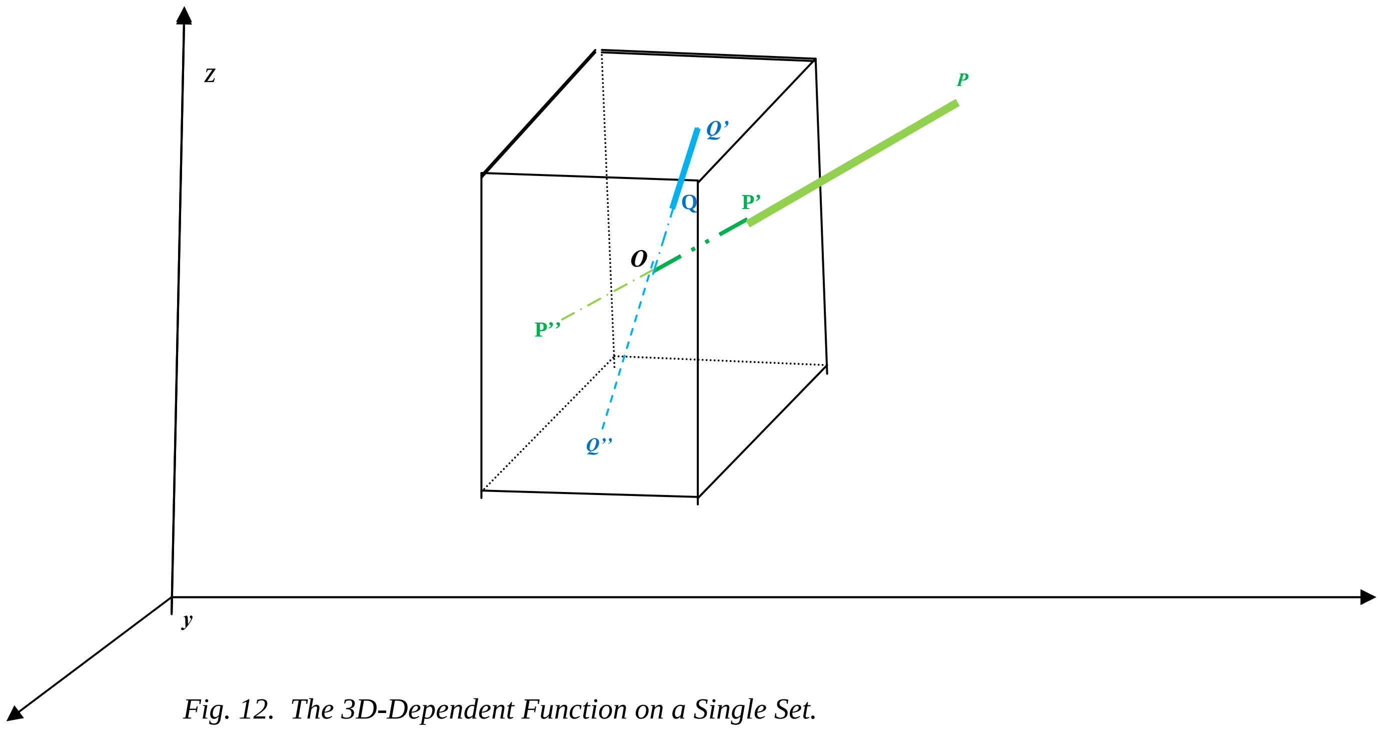

Fig. 12. The 3D-Dependent Function on a Single Set.

The dependent values on the single 3D-set is calculated for the following points:

$$k(P) = -\frac{|PP'|}{|P''P'|}, k(Q) = +\frac{|QQ'|}{|Q''Q'|}, k(P') = k(Q') = 0.$$

References:

Publications

1. Florentin Smarandache, *Generalizations of the Distance and Dependent Function in Extenics to 2D, 3D, and n-D*, "Global Journal of Science Frontier Research (GJSFR)" [USA, U.K., India], Vol. 12, Issue 8, pp. 47-60, 2012;
   and in "Progress in Physics", University of New Mexico, USA, Vol. 3, pp. 54-61, 2012.

2. Florentin Smarandache and Victor Vlădăreanu, *Applications of Extenics to 2D-Space and 3D-Space*, Proceedings of the 6th International Conference on Software, Knowledge, Information Management and Applications (SKIMA 2012), Chengdu University, China, 9-11 September 2012.
3. Florentin Smarandache, *Extension Transformation Used in I Ching*, to appear in Octagon Mathematics Journal, Brasov, Romania, 2013.
4. Florentin Smarandache, Mihai Liviu Smarandache, *Generalizations in Extenics of the Location Value and Dependent Function from A Single Finite Interval to 2D, 3D, and n-D Spaces*, to appear in Octagon Mathematics Journal, Brasov, Romania, 2013.

Presentations at National and International Conferences or Institutes:

5. Florentin Smarandache, *Generalizations of the Distance and Dependent Function in Extenics to 2D, 3D, and n-D*, Guangdong University of Technology, Institute of Extenics Research and Innovation Methods, Guangzhou, China, June 4th, 2012.
6. Florentin Smarandache and Victor Vlădăreanu, *Applications of Extenics to 2D-Space and 3D-Space*, The 6th International Conference on Software, Knownledge, Information Management and Applications (SKIMA 2012), Chengdu University, China, 9-11 September 2012;
   and at the Guangdong University of Technology, Institute of Extenics Research and Innovation Methods, Guangzhou, China, June 11th, 2012;
7. Florentin Smarandache and Ştefan Vladuţescu, *Extention Communication for Solving the Ontological Contradiction between Communication and Information*, Guangdong University of Technology, Institute of Extenics Research and Innovation Methods, Guangzhou, China, August 8th, 2012.
8. Florentin Smarandache, *Extension Transformation Used in I Ching*, Guangdong University of Technology, Institute of Extenics Research and Innovation Methods, Guangzhou, China, August 2nd, 2012.
9. Florentin Smarandache, *Generalization of the Dependent Function in Extenics for Nested Sets with Common Endpoints to 2D-Space, 3D-Space, and generally to n-D-Space*, Guangdong University of Technology, Institute of Extenics Research and Innovation Methods, Guangzhou, China, July 19nd, 2012.

Generalizations of the Distance and Dependent Function in Extenics to *2D, 3D*, and *n-D*

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Abstract.
Dr. Cai Wen defined in his 1983 paper:
- the distance formula between a point x_0 and an one-dimensional (*1D*) interval $<a, b>$;
- and the dependence function which gives the degree of dependence of a point with respect to a pair of included *1D*-intervals.

His paper inspired us to generalize the Extension Set to two-dimensions, i.e. in plane of real numbers R^2 where one has a rectangle (instead of a segment of line), determined by two arbitrary points $A(a_1, a_2)$ and $B(b_1, b_2)$. And similarly in R^3, where one has a prism determined by two arbitrary points $A(a_1, a_2, a_3)$ and $B(b_1, b_2, b_3)$. We geometrically define the linear and non-linear distance between a point and the *2D*- and *3D*-extension set and the dependent function for a nest of two included *2D*- and *3D*-extension sets. Linearly and non-linearly attraction point principles towards the optimal point are presented as well.
The same procedure can be then used considering, instead of a rectangle, any bounded *2D*-surface and similarly any bounded *3D*-solid, and any bounded *n-D*-body in R^n.
These generalizations are very important since the Extension Set is generalized from one-dimension to *2, 3* and even *n*-dimensions, therefore more classes of applications will result in consequence.

1. Introduction.

Extension Theory (or Extenics) was developed by Professor Cai Wen in 1983 by publishing a paper called "Extension Set and Non-Compatible Problems". Its goal is to solve contradictory problems and also nonconventional, nontraditional ideas in many fields.
Extenics is at the confluence of three disciplines: philosophy, mathematics, and engineering.
A contradictory problem is converted by a transformation function into a non-contradictory one.
The functions of transformation are: extension, decomposition, combination, etc.
Extenics has many practical applications in Management, Decision-Making, Strategic Planning, Methodology, Data Mining, Artificial Intelligence, Information Systems, Control Theory, etc.
Extenics is based on matter-element, affair-element, and relation-element.

2. Extension Distance in 1D-space.

Let’s use the notation *<a, b>* for any kind of closed, open, or half-closed interval { [a, b], (a, b), (a, b], [a, b) }.

Prof. Cai Wen has defined the extension distance between a point x_0 and a real interval X = *<a, b>*, by

$$\rho(x_0, X) = \left| x_0 - \frac{a+b}{2} \right| - \frac{b-a}{2} \qquad (1)$$

where in general $\rho : (R, R^2) \rightarrow (-\infty, +\infty)$. (2)

Algebraically studying this extension distance, we find that actually the range of it is:

$$\rho(x_0, X) \in [-\frac{b-a}{2}, +\infty) \qquad (3)$$

or its minimum range value $-\frac{b-a}{2}$ depends on the interval X extremities a and b,

and it occurs when the point x_0 coincides with the midpoint of the interval X, i.e. $x_0 = \frac{a+b}{2}$.

The closer is the <u>interior point</u> x_0 to the midpoint $\frac{a+b}{2}$ of the interval *<a, b>*, the negatively larger is $\rho(x_0, X)$.

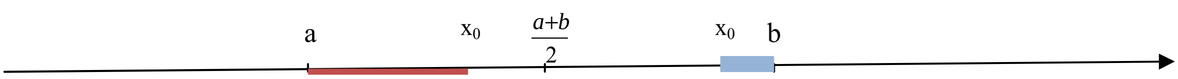

Fig. 1

In Fig. 1, for interior point x_0 between a and $\frac{a+b}{2}$, the extension distance $\rho(x_0, X)$ = a - x_0 =*the negative length of the brown line segment* [left side]. Whereas for interior point x_0 between $\frac{a+b}{2}$ and b, the extension distance $\rho(x_0, X)$ = x_0 - b =*the negative length of the blue line segment* [right side].

Similarly, the further is <u>exterior point</u> x_0 with respect to the closest extremity of the interval <a, b> to it (i.e. to either a or b), the positively larger is $\rho(x_0, X)$.

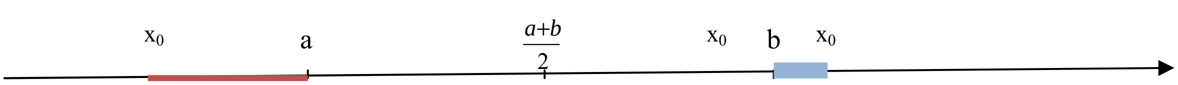

Fig. 2

In Fig. 2, for exterior point $x_0 < a$, the extension distance $\rho(x_0, X) = a - x_0$ =*the positive length of the brown line segment* [left side]. Whereas for exterior point $x_0 > b$, the extension distance $\rho(x_0, X) = x_0 - b$ =*the positive length of the blue line segment* [right side].

3. Principle of the Extension 1D-Distance.

Geometrically studying this extension distance, we find the following principle that Prof. Cai has used in 1983 defining it:

$\rho(x_0, X)$ = *the geometric distance between the point* x_0 *and the closest extremity point of the interval* $<a, b>$ *to it (going in the direction that connects* x_0 *with the optimal point), distance taken as negative if* $x_0 \in <a, b>$, *and as positive if* $x_0 \notin <a, b>$.

This principle is very important in order to generalize the extension distance from *1D* to *2D* (two-dimensional real space), *3D* (three-dimensional real space), and *n-D* (*n*-dimensional real space).

The extremity points of interval *<a, b>* are the point *a* and *b*, which are also the boundary (frontier) of the interval *<a, b>*.

4. Dependent Function in *1D-Space*.

Prof. Cai Wen defined in 1983 in *1D* the Dependent Function *K(y)*.

If one considers two intervals X_0 and *X,* that have no common end point, and $X_0 \subset X$, then:

$$K(y) = \frac{\rho(y, X)}{\rho(y, X) - \rho(y, X_0)}. \qquad (4)$$

Since *K(y)* was constructed in *1D* in terms of the extension distance $\rho(.,.)$, we simply generalize it to higher dimensions by replacing $\rho(.,.)$ with the generalized $\rho(.,.)$ in a higher dimension.

5. Extension Distance in 2D-Space.

Instead of considering a segment of line *AB* representing the interval *<a, b>* in *1R*, we consider a rectangle *AMBN* representing all points of its surface in *2D*. Similarly as for 1D-space, the rectangle in 2D-space may be closed (i.e. all points lying on its frontier belong to it), open (i.e. no point lying on its frontier belong to it), or partially closed (i.e. some points lying on its frontier belong to it, while other points lying on its frontier do not belong to it).

Let's consider two arbitrary points $A(a_1, a_2)$ and $B(b_1, b_2)$. Through the points *A* and *B* one draws parallels to the axes of the Cartesian system XY and one thus one forms a rectangle *AMBN* whose one of the diagonals is just *AB*.

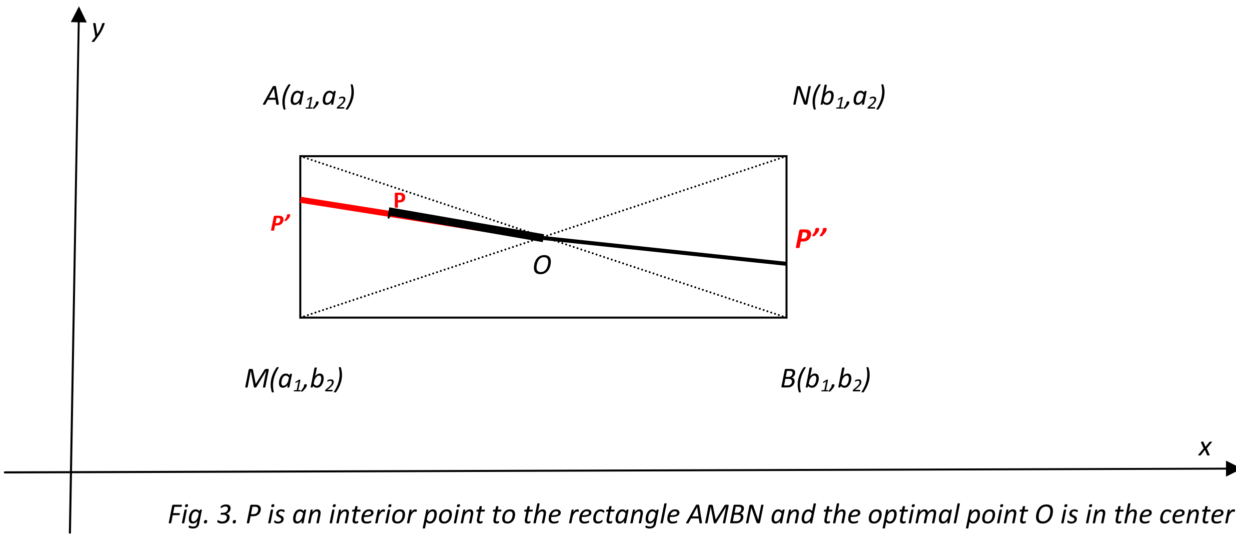

Fig. 3. P is an interior point to the rectangle AMBN and the optimal point O is in the center of symmetry of the rectangle

Let's note by *O* the midpoint of the diagonal *AB*, but *O* is also the center of symmetry (intersection of the diagonals) of the rectangle *AMBN*.
Then one computes the distance between a point $P(x_0, y_0)$ and the rectangle *AMBN*.

One can do that following the same principle as Dr. Cai Wen did:
- compute the distance in *2D* (two dimensions) between the point *P* and the center *O* of the rectangle (intersection of rectangle's diagonals);
- next compute the distance between the point *P* and the closest point (let's note it by *P'*) to it on the frontier (the rectangle's four edges) of the rectangle *AMBN*;

this step can be done in the following way:

considering *P'* as the intersection point between the line *PO* and the frontier of the rectangle, and taken among the intersection points that point *P'* which is the closest to *P*; this case is entirely consistent with Dr. Cai's approach in the sense that when reducing from a *2D*-space problem to two *1D*-space problems, one exactly gets his result.

The Extension *2D*-Distance, for $P \neq O$, will be:

$$\rho((x_0, y_0), AMBM) = d(\text{point } P, \text{rectangle } AMBN) = |PO| - |P'O| = \pm |PP'| \qquad (5)$$

i) which is equal to the __negative__ length of the red segment |PP'| in Fig. 3 when P is interior to the rectangle AMBN;

ii) or equal to __zero__ when P lies on the frontier of the rectangle AMBN (i.e. on edges AM, MB, BN, or NA) since P coincides with P';

iii) *or equal to the <u>positive</u> length of the blue segment |PP'| in Fig. 4 when P is exterior to the rectangle AMBN.*

where *|PO|* means the classical *2D*-distance between the point *P* and *O*, and similarly for *|P'O|* and *|PP'|*.

The Extension *2D*-Distance, for the optimal point (i.e. P=O), will be
$\rho(O, AMBM)$ = *d(point O, rectangle AMBN) = - max d(point O, point M on the frontier of AMBN).* *(6)*

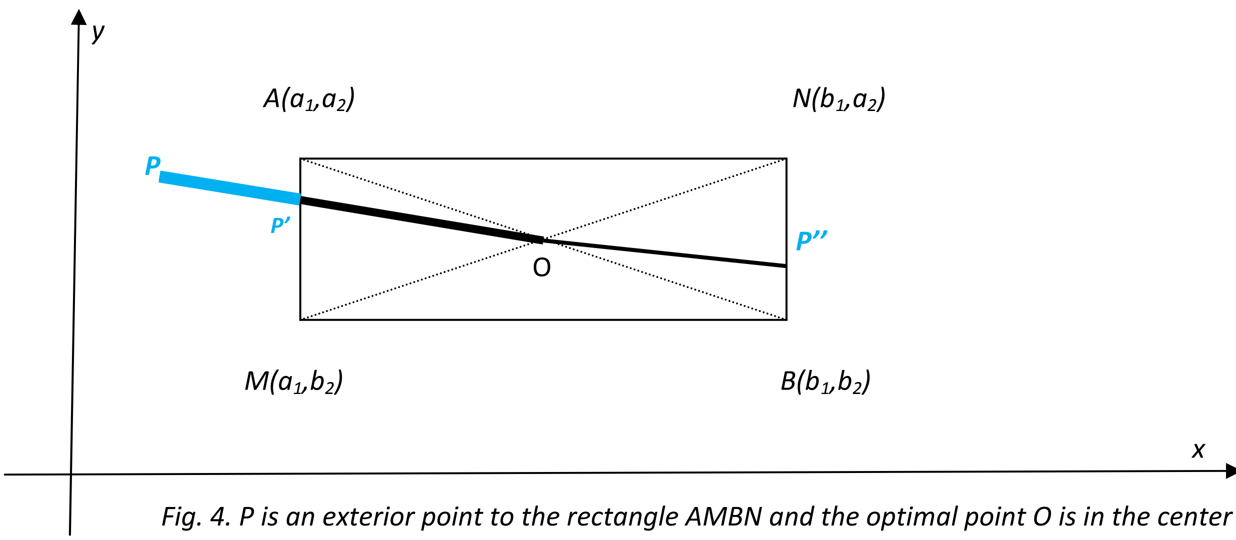

Fig. 4. P is an exterior point to the rectangle AMBN and the optimal point O is in the center of symmetry of the rectangle

The last step is to devise the Dependent Function in *2D*-space similarly as Dr. Cai's defined the dependent function in *1D*.

The midpoint (or center of symmetry) *O* has the coordinates $O(\frac{a_1+b_1}{2}, \frac{a_2+b_2}{2})$. (7)

Let's compute the *|PO| - |P'O|*. *(8)*

In this case, we extend the line *OP* to intersect the frontier of the rectangle *AMBN*. *P'* is closer to *P* than *P''*, therefore we consider *P'*.

The equation of the line *PO*, that of course passes through the points *P(x_0, y_0)* and $O(\frac{a_1+b_1}{2}, \frac{a_2+b_2}{2})$, is:

$$y-y_0=\frac{\frac{a_2+b_2}{2}-y_0}{\frac{a_1+b_1}{2}-x_0}(x-x_0) \qquad (9)$$

Since the *x*-coordinate of point *P'* is a_1 because *P'* lies on the rectangle's edge *AM*, one gets the *y*-coordinate of point *P'* by a simple substitution of $x_{P'}=a_1$ into the above equality:

$$y_{P'}=y_0+\frac{a_2+b_2-2y_0}{a_1+b_1-2x_0}(a_1-x_0)\,. \qquad (10)$$

Therefore *P'* has the coordinates $P'(\ x_{P'}=a_1,\ y_{P'}=y_0+\frac{a_2+b_2-2y_0}{a_1+b_1-2x_0}(a_1-x_0)\ )$. (11)

The distance $d(P,O)=|PO|=\sqrt{(x_0-\frac{a_1+b_1}{2})^2+(y_0-\frac{a_2+b_2}{2})^2}$ (12)

while the distance

$$d(P',O)=|P'O|=\sqrt{(a_1-\frac{a_1+b_1}{2})^2+(y_{P'}-\frac{a_2+b_2}{2})^2}=\sqrt{(\frac{a_1-b_1}{2})^2+(y_{P'}-\frac{a_2+b_2}{2})^2} \qquad (13)$$

Also, the distance $d(P,P')=|PP'|=\sqrt{(a_1-x_0)^2+(y_{P'}-y_0)^2}$. (14)

Whence the Extension *2D*-Distance formula:

$\rho((x_0,y_0),AMBM) = d(\ P(x_0,y_0),\ A(a_1,a_2)MB(b_1,b_2)N\ ) = |PO| - |P'O|$ (15)

$$=\sqrt{(x_0-\frac{a_1+b_1}{2})^2+(y_0-\frac{a_2+b_2}{2})^2}-\sqrt{(\frac{a_1-b_1}{2})^2+(y_{P'}-\frac{a_2+b_2}{2})^2} \qquad (16)$$

$= \pm\ |PP'|$ (17)

$= \pm\sqrt{(a_1-x_0)^2+(y_{P'}-y_0)^2}$ (18)

where $y_{P'}=y_0+\frac{a_2+b_2-2y_0}{a_1+b_1-2x_0}(a_1-x_0)$. (19)

6. Properties.

As for *1D*-distance, the following properties hold in *2D*:

6.1. Property 1.

a) $(x,y)\in$ Int(*AMBN*) *iff* $\rho((x,y),AMBN)<0$, *where Int(AMBN) means interior of AMBN;*

b) $(x,y) \in \mathrm{Fr}(AMBN)$ *iff* $\rho((x,y), AMBN) = 0$, *where Fr(AMBN) means frontier of AMBN;*

c) $(x,y) \notin AMBN$ *iff* $\rho((x,y), AMBN) > 0$.

6.2. Property 2.

Let $A_0M_0B_0N_0$ and $AMBN$ be two rectangles whose sides are parallel to the axes of the Cartesian system of coordinates, such that they have no common end points, and $A_0M_0B_0N_0 \subset AMBN$. We assume they have the same optimal points $O_1 \equiv O_2 \equiv O$ located in the center of symmetry of the two rectangles.

Then for any point $(x,y) \in R^2$ one has $\rho((x,y), A_0M_0B_0N_0) \geq \rho((x,y), AMBN)$.

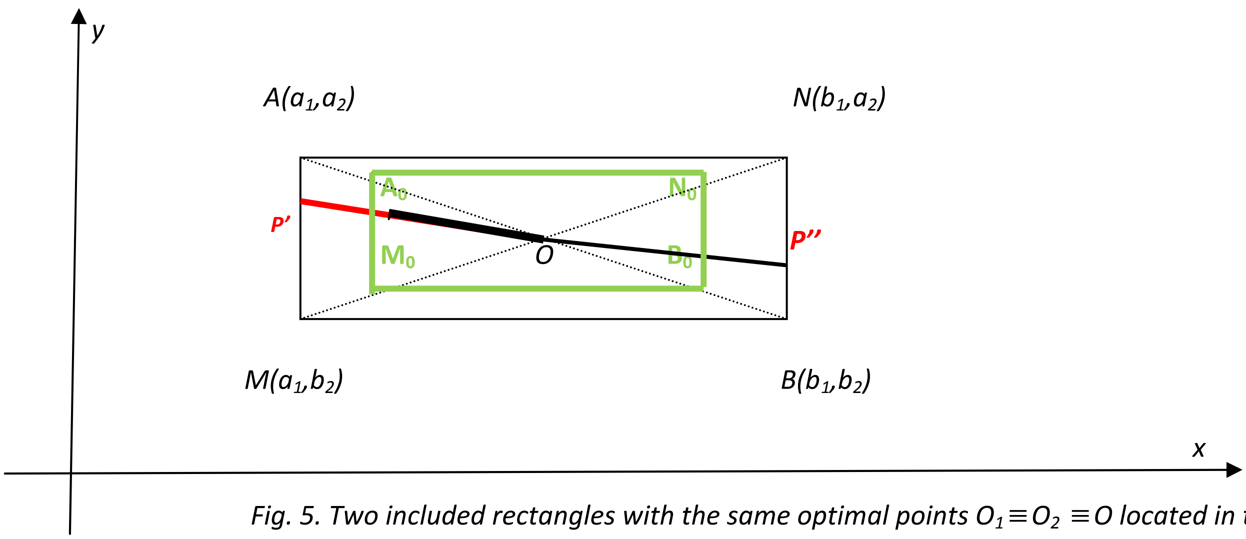

Fig. 5. Two included rectangles with the same optimal points $O_1 \equiv O_2 \equiv O$ located in their common center of symmetry

7. Dependent *2D*-Function.

Let $A_0M_0B_0N_0$ and $AMBN$ be two rectangles whose sides are parallel to the axes of the Cartesian system of coordinates, such that they have no common end points, and $A_0M_0B_0N_0 \subset AMBN$.

The **Dependent *2D*-Function** formula is:

$$K_{2D}(x,y) = \frac{\rho((x,y), AMBN)}{\rho((x,y), AMBN) - \rho((x,y), A_0M_0B_0N_0)} \tag{20}$$

7.1. Property 3.

Again, similarly to the Dependent Function in *1D*-space, one has:

a) If $(x,y) \in Int(A_0M_0B_0N_0)$, then $K_{2D}(x,y) > 1$;

b) If $(x,y) \in Fr(A_0M_0B_0N_0)$, then $K_{2D}(x,y) = 1$;

c) If $(x,y) \in Int(AMBN - A_0M_0B_0N_0)$, then $0 < K_{2D}(x,y) < 1$;

d) If $(x,y) \in Fr(AMBN)$, then $K_{2D}(x,y) = 0$;

e) If $(x,y) \notin AMBN$, then $K_{2D}(x,y) < 0$.

8. General Case in *2D*-Space.

One can replace the rectangles by any finite surfaces, bounded by closed curves in *2D*-space, and one can consider any optimal point *O* (not necessarily the symmetry center). Again, we assume the optimal points are the same for this nest of two surfaces.

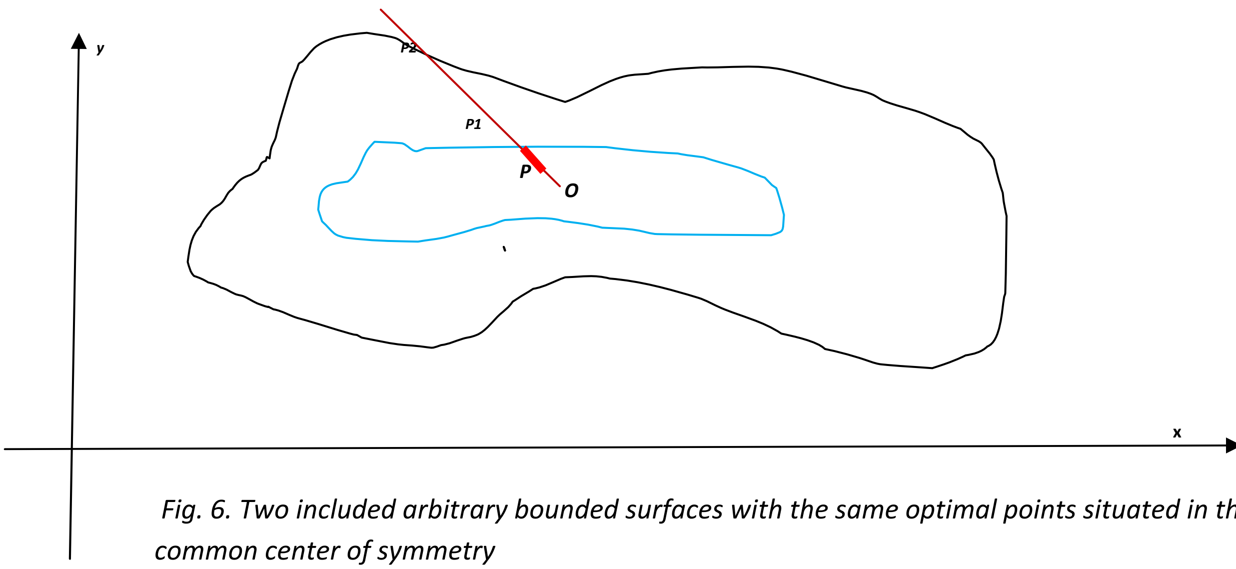

Fig. 6. Two included arbitrary bounded surfaces with the same optimal points situated in their common center of symmetry

9. Linear Attraction Point Principle.

We introduce the Attraction Point Principle, which is the following:

Let $\mathcal{S}$ be a given set in the universe of discourse *U*, and the optimal point $O \in \mathcal{S}$. Then each point $P(x_1, x_2, \ldots, x_n)$ from the universe of discourse tends towards, or is attracted by, the optimal point *O*, because the optimal point *O* is an ideal of each point.

That's why one computes the extension *n-D*-distance between the point *P* and the set $\mathcal{S}$ as $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ on the direction determined by the point *P* and the optimal point *O*, or on the line *PO*, i.e.:

a) $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ = the *negative distance* between *P* and the set frontier, if *P* is inside the set $\mathcal{S}$;

b) $\rho((x_1, x_2, \ldots, x_n), \mathcal{S}) = 0$, if *P* lies on the frontier of the set $\mathcal{S}$;

c) $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ = the *positive distance* between *P* and the set frontier, if *P* is outside the set.

It is a king of convergence/attraction of each point towards the optimal point. There are classes of examples where such attraction point principle works.

If this principle is good in all cases, then there is no need to take into consideration the center of symmetry of the set $\mathcal{S}$, since for example if we have a *2D* piece which has heterogeneous material density, then its center of weight (barycenter) is different from the center of symmetry.

Let's see below such example in the *2D*-space:

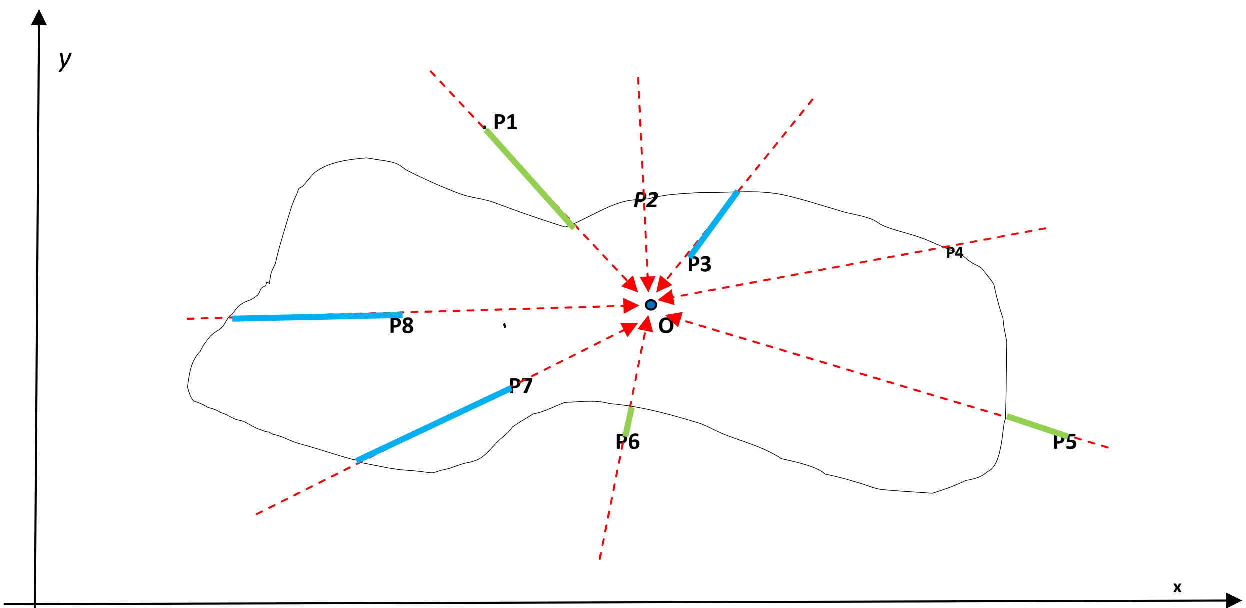

Fig. 7. The optimal point O as an attraction point for all other points $P_1, P_2, \ldots, P_8$ in the universe of discourse R^2

10. Remark 1.

Another possible way, for computing the distance between the point *P* and the closest point *P'* to it on the frontier (the rectangle's four edges) of the rectangle *AMBN*, would be by drawing a perpendicular (or a geodesic) from *P* onto the closest rectangle's edge, and denoting by P' the intersection between the perpendicular (geodesic) and the rectangle's edge.

And similarly if one has an arbitrary set $\mathcal{S}$ in the *2D*-space, bounded by a closed curve. One computes

$$d(P, \mathcal{S}) = \inf_{Q \in S} |PQ| \tag{21}$$

as in the classical mathematics.

11. Extension Distance in *3D-Space*.

We further generalize to *3D*-space the Extension Set and the Dependent Function.
Assume we have two points *A(a1, a2, a3)* and *B(b1, b2, b3)* in *3D*. Drawing through *A* and *B* parallel planes to the planes' axes *(XY, XZ, YZ)* in the Cartesian system *XYZ* we get a prism $AM_1M_2M_3BN_1N_2N_3$ (with eight vertices) whose one of the transversal diagonals is just the line segment *AB*. Let's note by *O* the midpoint of the transverse diagonal *AB*, but *O* is also the center of symmetry of the prism.

Therefore, from the line segment *AB* in *1D*-space, to a rectangle *AMBN* in *2D*-space, and now to a prism $AM_1M_2M_3BN_1N_2N_3$ in *3D*-space. Similarly to 1D- and 2D-space, the prism may be closed (i.e. all points lying on its frontier belong to it), open (i.e. no point lying on its frontier belong to it), or partially closed (i.e. some points lying on its frontier belong to it, while other points lying on its frontier do not belong to it).

Then one computes the distance between a point $P(x_0, y_0, z_0)$ and the prism $AM_1M_2M_3BN_1N_2N_3$.

One can do that following the same principle as Dr. Cai's:
- compute the distance in *3D* (two dimensions) between the point *P* and the center *O* of the prism (intersection of prism's transverse diagonals);
- next compute the distance between the point *P* and the closest point (let's note it by *P'*) to it on the frontier (the prism's lateral surface) of the prism $AM_1M_2M_3BN_1N_2N_3$;

considering P' as the intersection point between the line *OP* and the frontier of the prism, and taken among the intersection points that point *P'* which is the closest to *P*; this case is entirely consistent with Dr. Cai's approach in the sense that when reducing from *3D*-space to *1D*-space one gets exactly Dr. Cai's result;

- the Extension *3D*-Distance will be: $d(P, AM_1M_2M_3BN_1N_2N_3) = |PO| - |P'O| = \pm |PP'|$,
where *|PO|* means the classical distance in *3D*-space between the point *P* and *O*, and similarly for *|P'O| and |PP'|*.

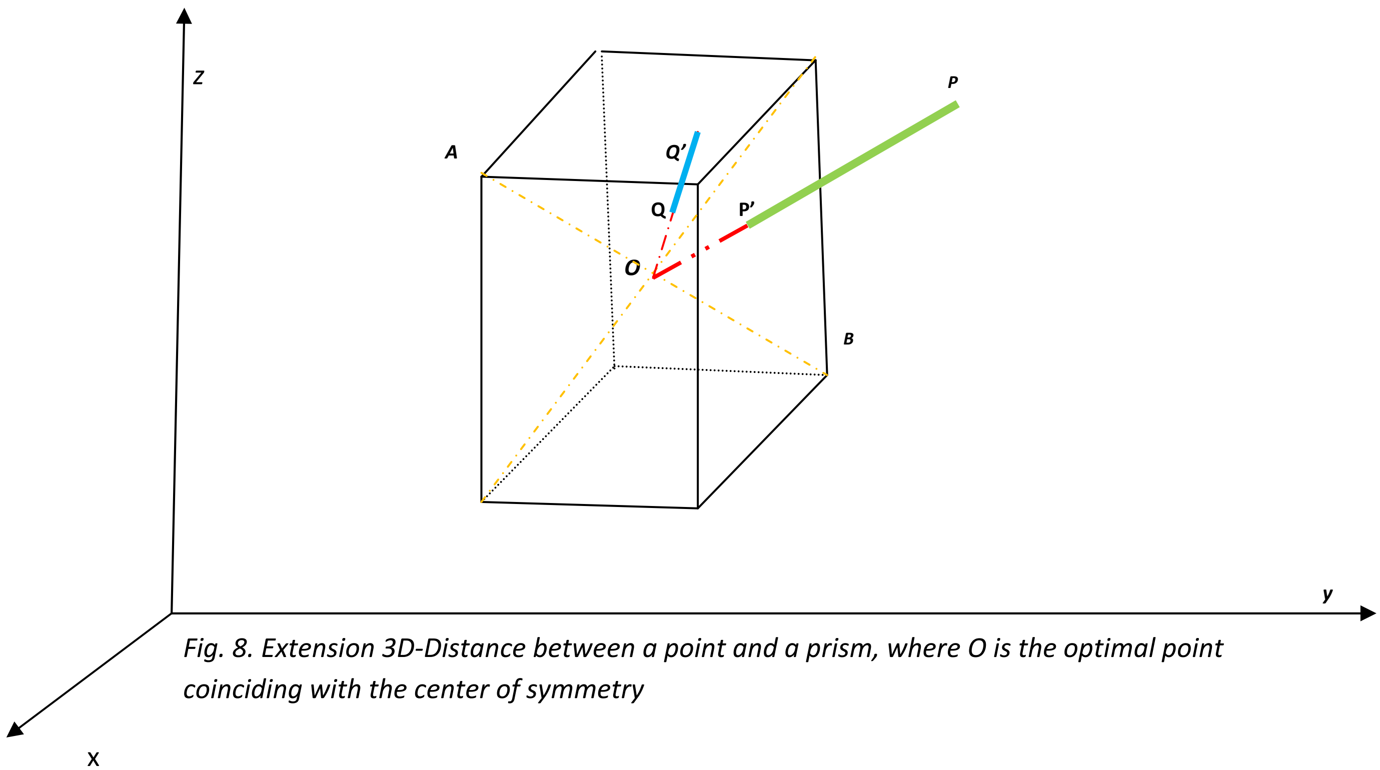

Fig. 8. Extension 3D-Distance between a point and a prism, where O is the optimal point coinciding with the center of symmetry

12. Property 4.

a) (x,y,z)$\in$ Int($AM_1M_2M_3BN_1N_2N_3$) *iff* $\rho((x,y,z), AM_1M_2M_3BN_1N_2N_3) < 0$, *where* Int($AM_1M_2M_3BN_1N_2N_3$) *means interior of* $AM_1M_2M_3BN_1N_2N_3$*;*

b) (x,y,z)$\in$ Fr($AM_1M_2M_3BN_1N_2N_3$) *iff* $\rho((x,y,z), AM_1M_2M_3BN_1N_2N_3) = 0$, *where* Fr($AM_1M_2M_3BN_1N_2N_3$) *means frontier of* $AM_1M_2M_3BN_1N_2N_3$*;*

c) (x,y,z)$\notin$ $AM_1M_2M_3BN_1N_2N_3$ *iff* $\rho((x,y,z), AM_1M_2M_3BN_1N_2N_3) > 0$.

13. Property 5.

Let $A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03}$ and $AM_1M_2M_3BN_1N_2N_3$ be two prisms whose sides are parallel to the axes of the Cartesian system of coordinates, such that they have no common end points, and $A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03} \subset AM_1M_2M_3BN_1N_2N_3$. We assume they have the same optimal points $O_1 \equiv O_2 \equiv O$ located in the center of symmetry of the two prisms.

Then for any point $(x,y,z) \in R^3$ one has
$\rho((x,y,z), A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03}) \geq \rho((x,y,z), AM_1M_2M_3BN_1N_2N_3)$.

14. The Dependent *3D*-Function.

The last step is to devise the Dependent Function in *3D*-space similarly to Dr. Cai's definition of the dependent function in *1D*-space.
Let $A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03}$ and $AM_1M_2M_3BN_1N_2N_3$ be two prisms whose faces are parallel to the axes of the Cartesian system of coordinates *XYZ*, such that they have no common end points, such that $A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03} \subset AM_1M_2M_3BN_1N_2N_3$. We assume they have the same optimal points $O_1 \equiv O_2 \equiv O$ located in the center of symmetry of these two prisms.

The **Dependent *3D*-Function** formula is:

$$K_{3D}(x,y,z) = \frac{\rho((x,y,z), AM_1M_2M_3BN_1N_2N_3)}{\rho((x,y,z), AM_1M_2M_3BN_1N_2N_3) - \rho((x,y,z), A_0M_{01}M_{02}M_{03}BN_{01}N_{02}N_{03})} \quad (22)$$

15. Property 6.

Again, similarly to the Dependent Function in *1D*- and *2D*-spaces, one has:

a) If $(x,y,z) \in Int(A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03})$, then $K_{3D}(x,y,z) > 1$;
b) If $(x,y,z) \in Fr(A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03})$, then $K_{3D}(x,y,z) = 1$;
c) If $(x,y,z) \in Int(AM_1M_2M_3BN_1N_2N_3 - A_0M_{01}M_{02}M_{03}B_0N_{01}N_{02}N_{03})$, then $0 < K_{3D}(x,y,z) < 1$;
d) If $(x,y,z) \in Fr(AM_1M_2M_3BN_1N_2N_3)$, then $K_{3D}(x,y,z) = 0$;
e) If $(x,y,z) \notin AM_1M_2M_3BN_1N_2N_3$, then $K_{3D}(x,y,z) < 0$.

16. General Case in *3D*-Space.

One can replace the prisms by any finite *3D*-bodies, bounded by closed surfaces, and one considers any optimal point *O* (not necessarily the centers of surfaces' symmetry). Again, we assume the optimal points are the same for this nest of two *3D*-bodies.

17. Remark 2.

Another possible way, for computing the distance between the point *P* and the closest point *P'* to it on the frontier (lateral surface) of the prism $AM_1M_2M_3BN_1N_2N_3$ is by drawing a perpendicular (or a geodesic) from *P* onto the closest prism's face, and denoting by P' the intersection between the perpendicular (geodesic) and the prism's face.

And similarly if one has an arbitrary finite body $\mathcal{B}$ in the *3D*-space, bounded by surfaces. One computes as in classical mathematics:

$$d(P, B) = \inf_{Q \in B} |PQ| \qquad (23)$$

18. Linear Attraction Point Principle in 3D-Space.

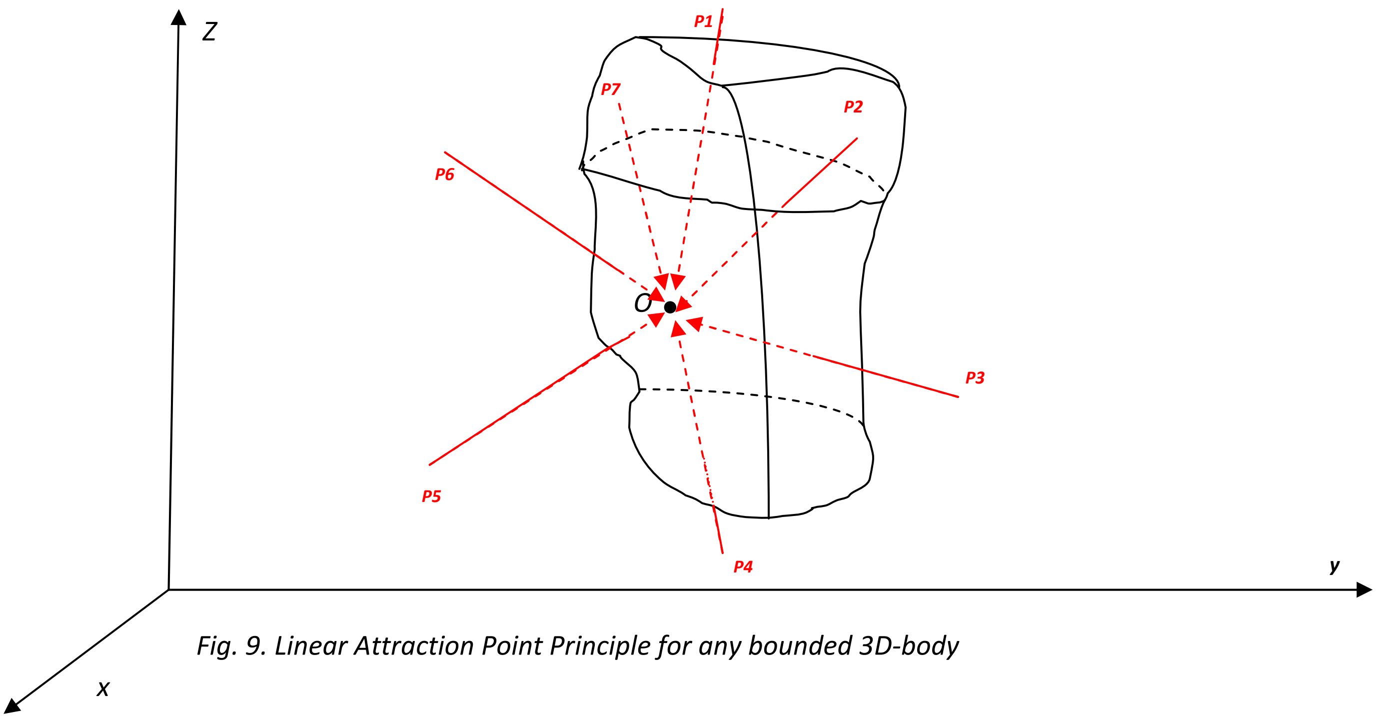

Fig. 9. Linear Attraction Point Principle for any bounded 3D-body

19. Non-Linear Attraction Point Principle in 3D-Space (and in n-D-Space).

There might be spaces where the attraction phenomena undergo not linearly by upon some specific non-linear curves. Let's see below such example for points P_i whose trajectories of attraction towards the optimal point follow some non-linear *3D*-curves.

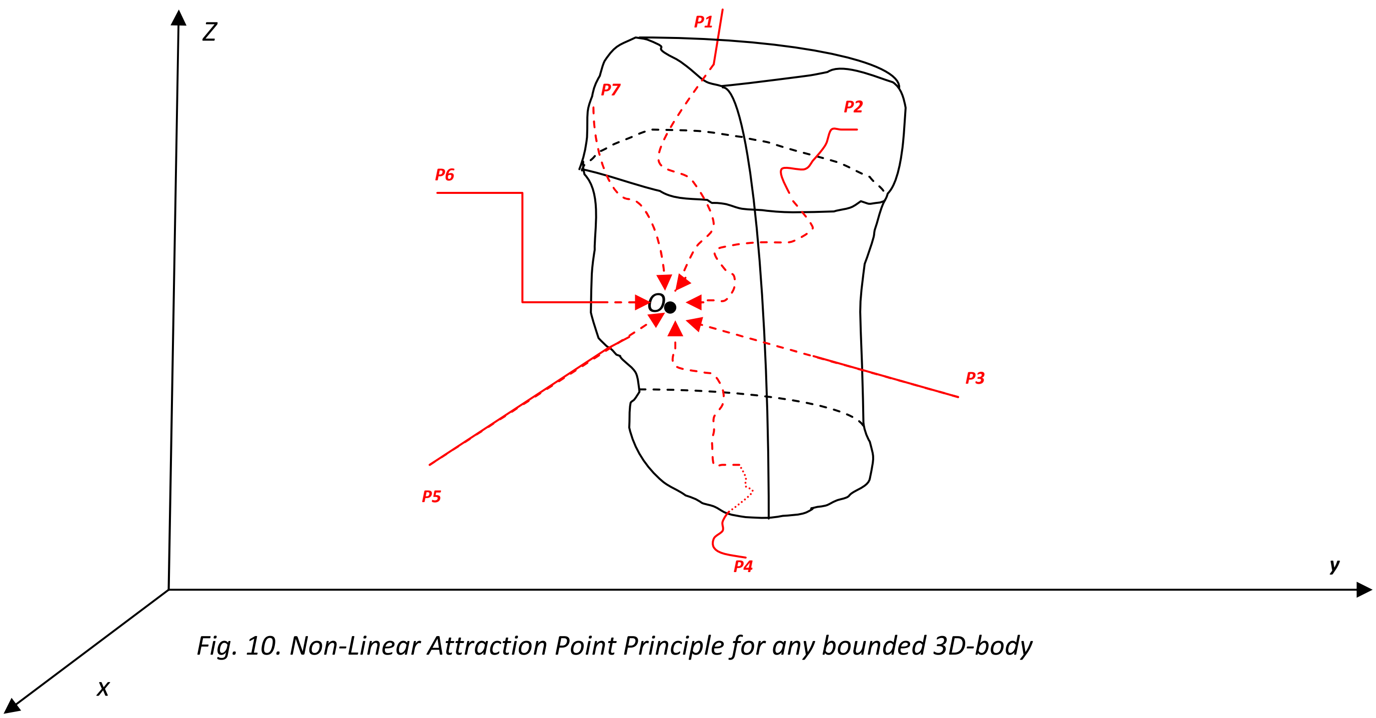

Fig. 10. Non-Linear Attraction Point Principle for any bounded 3D-body

20. n-D-Space.

In general, in a universe of discourse *U*, let's have an *n-D*-set $\mathcal{S}$ and a point *P*.
Then the **Extension Linear *n-D*-Distance** between point *P* and set $\mathcal{S}$, is:

$$\rho(P,S)=\begin{cases} \underset{P'\in Fr(S)}{-d(P,P')}, & P\neq O, P\in|OP'|; \\ \underset{P'\in Fr(S)}{d(P,P')}, & P\neq O, P'\in|OP|; \\ -\max\limits_{M\in Fr(S)} d(P,M), & P=O. \end{cases} \tag{24}$$

where *O* is the optimal point (or linearly attraction point);
d(P,P') means the classical linearly *n-D*-distance between two points *P* and *P'*;
Fr($\mathcal{S}$*)* means the frontier of set $\mathcal{S}$;
and *|OP'|* means the line segment between the points *O* and *P'* (the extremity points *O* and *P'* included), therefore *P*∈ *|OP'|* means that *P* lies on the line *OP'*, in between the points *O* and *P'*.

For *P* coinciding with *O*, one defined the distance between the optimal point *O* and the set S as the negatively maximum distance (to be in concordance with the *1D*-definition).

And the **Extension Non-Linear *n-D*-Distance** between point *P* and set S, is:

$$\rho_c(P,S)=\begin{cases} \underset{P'\in Fr(S)}{-d_c(P,P')}, & P\neq O, P\in c(OP'); \\ \underset{P'\in Fr(S)}{d_c(P,P')}, & P\neq O, P'\in c(OP); \\ -\max\limits_{M\in Fr(S), M\in c(O)} d_c(P,M), & P=O. \end{cases} \tag{25}$$

where $\rho_c(P,S)$ means the extension distance as measured along the curve *c*;
O is the optimal point (or non-linearly attraction point);
the points are attracting by the optimal point on trajectories described by an injective curve *c*;
$d_c(P,P')$ means the non-linearly *n-D*-distance between two points *P* and *P'*, or the arclength of the curve *c* between the points *P* and *P'*;
$Fr(S)$ means the frontier of set S;
and c(*OP'*) means the curve segment between the points *O* and *P'* (the extremity points *O* and *P'* included), therefore $P\in c(OP')$ means that *P* lies on the curve *c* in between the points *O* and *P'*.
For *P* coinciding with *O*, one defined the distance between the optimal point *O* and the set S as the negatively maximum curvilinear distance (to be in concordance with the *1D*-definition).

In general, in a universe of discourse *U*, let's have a nest of two *n-D*-sets, $S_1 \subset S_2$, with no common end points, and a point *P*.
Then the **Extension Linear Dependent *n-D*-Function** referring to the point $P(x_1, x_2, \ldots, x_n)$ is:

$$K_{nD}(P)=\frac{\rho(P,S_2)}{\rho(P,S_2)-\rho(P,S_1)} \tag{26}$$

where $\rho(P,S_2)$ is the previous extension linear n-D-distance between the point *P* and the *n-D*-set S_2.

And the **Extension Non-Linear Dependent n-D-Function** referring to point $P(x_1, x_2, \ldots, x_n)$ along the curve *c* is:

$$K_{nD}(P)=\frac{\rho_c(P,S_2)}{\rho_c(P,S_2)-\rho_c(P,S_1)} \tag{27}$$

where $\rho_c(P,S_2)$ is the previous extension non-linear n-D-distance between the point *P* and the *n-D*-set S_2 along the curve *c*.

21. Remark 3.

Particular cases of curves *c* could be interesting to studying, for example if *c* are parabolas, or have elliptic forms, or arcs of circle, etc. Especially considering the geodesics would be for many practical applications.

Tremendous number of applications of Extenics could follow in all domains where attraction points would exist; these attraction points could be in physics (for example, the earth center is an attraction point), economics (attraction towards a specific product), sociology (for example attraction towards a specific life style), etc.

22. Conclusion.

In this paper we introduced the **Linear and Non-Linear Attraction Point Principle**, which is the following:

Let $\mathcal{S}$ be an arbitrary set in the universe of discourse *U* of any dimension, and the optimal point $O \in \mathcal{S}$. Then each point $P(x_1, x_2, \ldots, x_n)$, $n \geq 1$, from the universe of discourse (linearly or non-linearly) tends towards, or is attracted by, the optimal point *O*, because the optimal point *O* is an ideal of each point.

It is a king of convergence/attraction of each point towards the optimal point. There are classes of examples and applications where such attraction point principle may apply.

If this principle is good in all cases, then there is no need to take into consideration the center of symmetry of the set $\mathcal{S}$, since for example if we have a *2D* factory piece which has heterogeneous material density, then its center of weight (barycenter) is different from the center of symmetry.

Then we generalized in the track of Cai Wen's idea the extension *1D*-set to an extension *n-D*-set, and defined the Linear (or Non-Linear) **Extension *n-D*-Distance** between a point $P(x_1, x_2, \ldots, x_n)$ and the *n-D*-set $\mathcal{S}$ as $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ on the linear (or non-linear) direction determined by the point *P* and the optimal point *O* (the line *PO,* or respectively the curvilinear *PO)* in the following way:

d) $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ = the *negative distance* between *P* and the set frontier, if *P* is inside the set $\mathcal{S}$;
e) $\rho((x_1, x_2, \ldots, x_n), \mathcal{S}) = 0$, if *P* lies on the frontier of the set $\mathcal{S}$;
f) $\rho((x_1, x_2, \ldots, x_n), \mathcal{S})$ = the *positive distance* between *P* and the set frontier, if *P* is outside the set.

We got the following **properties**:

a) It is obvious from the above definition of the extension *n-D*-distance between a point *P* in the universe of discourse and the extension *n-D*-set $\mathcal{S}$ that:
    i) Point $P(x_1, x_2, \ldots, x_n) \in \mathrm{Int}(\mathcal{S})$ iff $\rho((x_1, x_2, \ldots, x_n), \mathcal{S}) < 0$;
    ii) Point $P(x_1, x_2, \ldots, x_n) \in \mathrm{Fr}(\mathcal{S})$ iff $\rho((x_1, x_2, \ldots, x_n), \mathcal{S}) = 0$;
    iii) Point $P(x_1, x_2, \ldots, x_n) \notin \mathcal{S}$ iff $\rho((x_1, x_2, \ldots, x_n), \mathcal{S}) > 0$.

b) Let S_1 and S_2 be two extension sets, in the universe of discourse *U,* such that they have no common end points, and $S_1 \subset S_2$. We assume they have the same optimal points $O_1 \equiv O_2 \equiv O$ located in their center of symmetry. Then for any point $P(x_1, x_2, \ldots, x_n) \in U$ one has:

$$\rho((x_1, x_2, \ldots, x_n), S_1) \geq \rho((x_1, x_2, \ldots, x_n), S_2). \tag{28}$$

Then we proceed to the generalization of the dependent function from *1D*-space to Linear (or Non-Linear) *n-D*-space Dependent Function, using the previous notations.

The **Linear (**or **Non-Linear) Dependent *n-D*-Function** of point $P(x_1, x_2, \ldots, x_n)$ along the curve *c*, is:

$$K_{nD}(x_1, x_2, \ldots, x_n) = \frac{\rho_c((x_1, x_2, \ldots, x_n), S_2)}{\rho_c((x_1, x_2, \ldots, x_n), S_2) - \rho_c((x_1, x_2, \ldots, x_n), S_1)} \tag{29}$$

(where *c* may be a curve or even a line)

which has the following **property**:

f) If point $P(x_1, x_2, \ldots, x_n) \in \mathrm{Int}(S_1)$, then $K_{nD}(x_1, x_2, \ldots, x_n) > 1$;

g) If point $P(x_1, x_2, \ldots, x_n) \in \mathrm{Fr}(S_1)$, then $K_{nD}(x_1, x_2, \ldots, x_n) = 1$;

h) If point $P(x_1, x_2, \ldots, x_n) \in \mathrm{Int}(S_2 - S_1)$, then $K_{nD}(x_1, x_2, \ldots, x_n) \in (0, 1)$;

i) If point $P(x_1, x_2, \ldots, x_n) \in \mathrm{Int}(S_2)$, then $K_{nD}(x_1, x_2, \ldots, x_n) = 0$;

j) If point $P(x_1, x_2, \ldots, x_n) \notin \mathrm{Int}(S_2)$, then $K_{nD}(x_1, x_2, \ldots, x_n) < 0$.

References:

[1] Cai Wen. Extension Set and Non-Compatible Problems [J]. Journal of Scientific Exploration, 1983, (1): 83-97; also

Cai Wen. Extension Set and Non-Compatible Problems [A]. Advances in Applied Mathematics and Mechanics in China [C]. Peking: International Academic Publishers, 1990.1-21.

[2] Cai Wen. Extension theory and its application, [J]. Chinese Science Bulletin, 1999, 44 (7): 673-682.

Cai Wen. Extension theory and its application, [J]. Chinese Science Bulletin, 1999, 44 (17): 1538-1548.

[3] Yang Chunyan, Cai Wen. Extension Engineering [M]. Beijing: Science Press, 2007.

[4] Wu Wenjun et al. “Research on Extension theory and its application” Expert Opinion. 2004, 2;

http://web.gdut.edu.cn/~extenics/jianding.htm.

[5] Xiangshan Science Conferences Office. Scientific Significance and Future Development of Extenics – No. 271 Academic Discussion of Xiangshan Science Conferences, Brief Report of Xiangshan Science Conferences, Period 260, 2006, 1.

Applications of Extenics to 2D-Space and 3D-Space

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Abstract.

In this article one proposes several numerical examples for applying the extension set to 2D- and 3D-spaces. While rectangular and prism geometrical figures can easily be decomposed from 2D and 3D into 1D linear problems, similarly for the circle and the sphere, it is not possible in general to do the same for other geometrical figures.

1. Short Introduction.

Extenics has been used since 1983 by Cai Wen and many other Chinese scholars in solving contradictory problems. The distance between a number and a set, and the degree of dependence of a point with respect to a set were defined for the one-dimensional space, and later for higher dimensional spaces.

We present below several examples in 2D and 3D spaces.

2. Application 1.

We have a factory piece whose desired *2D*-dimensions should be *20 cm* $\times$ *30 cm*, and acceptable *2D*-dimensions *22 cm* $\times$ *34 cm.* We define the extension 2D-distance, and then we compute the extension 2D-dependent function. Let's do an extension diagram:

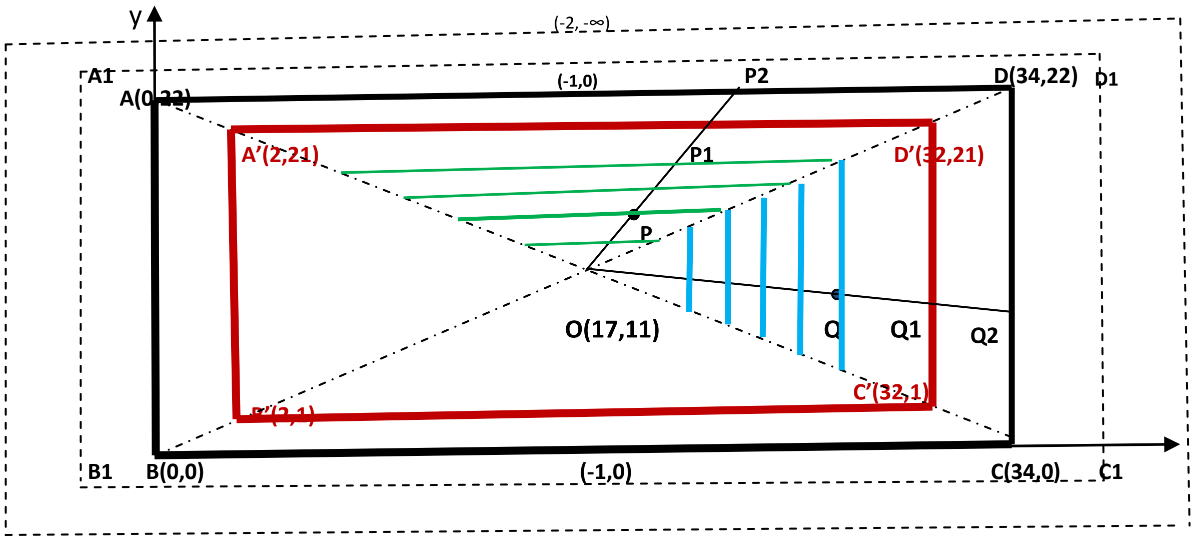

Diagram 1.

We have a desirable factory piece A'B'C'D' and an acceptable factory piece ABCD. The optimal point for both of them is O(17,11).

a) The region determined by the rays OA and OD.

The extension 2D-distance ρ between a point P and a set is the $\pm$ distance from P to the closest frontier of the set, distance measured on the line OP. Whence

$$\rho(P, A'B'C'D') = -|PP_1| \qquad (1)$$

and

$$\rho(P, ABCD) = -|PP_2|. \qquad (2)$$

The extension 2D-dependent function *k* of a point P which represents the dependent of the point of the nest of the two sets is:

$$k(P) = \pm\frac{\rho(P, bigger\_set)}{\rho(P, bigger\_set) - \rho(P, smaller\_set)} = \pm\frac{\rho(P, ABCD)}{\rho(P, ABCD) - \rho(P, A'B'C')} = \pm\frac{|PP_2|}{|PP_2| - |PP_1|} = \pm\frac{|PP_2|}{|P_1P_2|}. \qquad (3)$$

In other words, the extension 2D-dependent function k of a point P is the 2D-extension distance between the point and the closest frontier of the larger set, divided by the 2D-extension distance between the frontiers of the two nested sets; all these 2D-extension distances are taken along the line OP.

In our application one has:

$$k(P) = +\frac{|PP_2|}{|P_1P_2|} \qquad (4)$$

since P is inside of the larger set. If P was outside of the larger set, then k(P) would be negative.

Let's consider the coordinates of $P(x_0,y_0)$, where P is between the rays OA and OD in order to make sure OP intersects the line segments AD and A'D' which are closest frontiers of the rectangles ABCD and respectively A'B'C'D'. {The problem would be similar if P was in between the rays OB and OC.}

Hence $y_0 \in (11, \infty]$ but such y_0 that remains in between the rays OA and OD.

Let's find the coordinates of P_1.

In analytical geometry the equation of line OP passing through two points, O(17,11) and $P(x_0,y_0)$, is:

$$y - 11 = \frac{y_0 - 11}{x_0 - 17}(x - 17)\,. \qquad (5)$$

Since the y-coordinate of P_1 is 21, we replace y = 21 in the above equation and we get the x-coordinate of P_1.

Whence one has $P_1(\frac{10x_0 + 17y_0 - 357}{y_0 - 11}, 21)$.

Let's find the coordinates of P_2.

The y-coordinate of P_2 is 22. Replace *y = 22* in equation (2) and solve for the x-coordinate of P_2. One gets $P_2(\frac{11x_0 + 17y_0 - 374}{y_0 - 11}, 22)$.

The classical distance in *2D*-space between two points $M(m_1, m_2)$, $N(n_1, n_2)$ is

$$d(M,N) = \sqrt{(m_1 - n_1)^2 + (m_2 - n_2)^2}\,. \qquad (6)$$

We compute the classical *2D*-distances $d(P, P_2)$ and $d(P_1, P_2)$.

$$k(P)=\pm\frac{|PP_2|}{|P_1P_2|}=\pm\frac{\sqrt{\left(\frac{11x_0+17y_0-374}{y_0-11}-x_0\right)^2+(22-y_0)^2}}{\sqrt{\left(\frac{11x_0+17y_0-374}{y_0-11}-\frac{10x_0+17y_0-357}{y_0-11}\right)^2+(22-21)^2}}$$

$$=\pm\frac{\sqrt{\left(\frac{22x_0+17y_0-x_0y_0-374}{y_0-11}\right)^2+(y_0-22)^2}}{\sqrt{\left(\frac{x_0-17}{y_0-11}\right)^2+1}}=\pm\sqrt{\frac{\frac{(x_0-17)^2(y_0-22)^2}{(y_0-11)^2}+(y_0-22)^2}{\frac{(x_0-17)^2}{(y_0-11)^2}+1}}$$

$$=\pm|y_0-22|=\left\{\begin{matrix}22-y_0, & y_0\in(11,22]\\ 22-y_0, & y_0>22\end{matrix}\right\}=22-y_0,\ y_0>11 \tag{7}$$

and *P* in between the rays *OA* and *OD*.

Since the extension *2D*-dependent function $k(x_0,y_0) = 22-y_0$, for $y_0>11$, does not depend on x_0 for the region between rays *OA* and *OD*, one has classes of points lying on horizontal lines parallel to *A'D'* (see the green line segments on *Diagram 1*) whose extension *2D*-dependent function value is the same. For example, the green horizontal line segment passing thought *P* is the class of points having the same extension *2D*-dependent function value as point *P*.

b) The region determined by the rays *OC* and *OD*. {Similar result would obtain if one gets the opposite region determined by the rays *OA* and *OB*.}

If one takes another region determined by the rays OC and OD and a point $Q(x_1,y_1)$ in between one gets $k(Q)=k(x_1,y_1)=\pm\frac{|QQ_2|}{|Q_1Q_2|}$ (8)

By a similar method we find the Cartesian coordinates of the points Q_1 and Q_2.

In analytical geometry the equation of line OQ passing through two points, O(17,11) and $Q(x_1,y_1)$, is:

$$y-11=\frac{y_1-11}{x_1-17}(x-17)\,. \tag{9}$$

Since the x-coordinate of Q_1 is 32, we replace x = 32 in the above equation and we get the y-coordinate of P_1.

Whence one has $Q_1(32,\frac{11x_1+15y_1-352}{x_1-17})$. (10)

Let's find the coordinates of Q_2.

The x-coordinate of P_2 is 34. Replace x=22 in equation (3) and solve for the y-coordinate of Q_2.

One gets $Q_2(34, \frac{11x_1+17y_1-374}{x_1-17})$. (11)

We compute the classical 2D-distances d(Q, Q_2) and d(Q_1, Q_2).

$$k(P) = \pm\frac{|QQ_2|}{|Q_1Q_2|} = \pm\frac{\sqrt{(34-x_1)^2+\left(\frac{11x_1+17y_1-374}{x_1-17}-y_1\right)^2}}{\sqrt{(34-32)^2+\left(\frac{11x_1+17y_1-374}{x_1-17}-\frac{11x_1+15y_1-352}{x_1-17}\right)^2}}$$

$$= \pm\frac{\sqrt{(x_1-34)^2+\frac{(x_1-34)^2(y_1-11)^2}{(x_1-17)^2}}}{\sqrt{4+\frac{4(y_1-11)^2}{(x_1-17)^2}}} = \pm\frac{|x_1-34|}{2} = \frac{34-x_1}{2}, x_1>17$$

(12)

and Q in between the rays OC and OD.

Since the extension 2D-dependent function k(x_1,y_1) = $\frac{34-x_1}{2}$, for x_1 > 17, does not depend on y_1 for the region between rays OC and OD, one has classes of points lying on vertical lines parallel to C'D' (see the red line segments on Diagram 1) whose extension 2D-dependent function value is the same. For example, the blue vertical line segment passing thought Q is the class of points having the same extension 2D-dependent function value as point Q.

3. Splitting an extension 2D-problem into two 1D-problems.

Remarkably, for rectangular shapes one can decompose a 2D-problem into two 1D-problems. Yet, for other geometrical figures it is not possible. The more irregular geometrical figure, the less chance to decompose a 2D-problem into 1D-problems.

In our case, we separately consider the factory piece's width and length.

1) The width of a factory piece is desirable to be 20 cm and acceptable up to 22 cm.
2) And the length of a factory piece is desirable to be 30 cm and acceptable up to 34 cm.

In the first 1D-problem one makes the diagram:

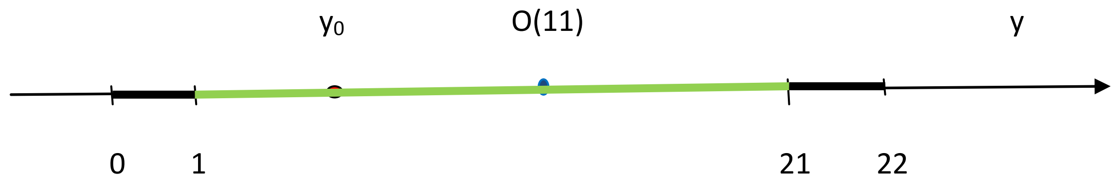

Diagram 2.

One computes, using Prof. Cai Wen's extention 1D-dependent function:

$$k(y_0) = \frac{|y_0 - 11| - \frac{22-0}{2}}{|y_0 - 11| - \frac{22-0}{2} - (|y_0 - 11| - \frac{21-1}{2})} = \frac{|y_0 - 11| - 11}{-11+10} = 11 - |y_0 - 11| \tag{13}$$

If $y_0 > 11$ as in our 2D-space problem, then $k(y_0) = 22 - y_0$ which is consistent with what we got in the 2D case.

In the second 1D-problem one makes the diagram:

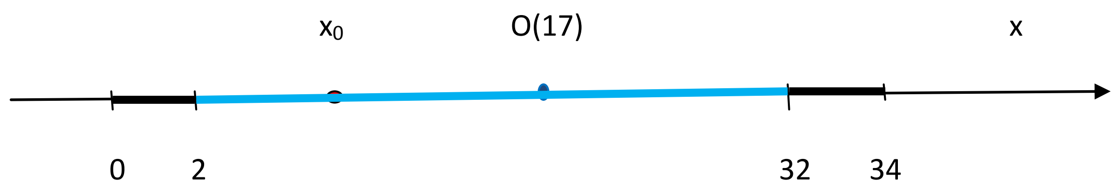

Diagram 3.

One computes, using Prof. Cai Wen's extension 1D-dependent function:

$$k(x_0) = \frac{|x_0 - 17| - \frac{34-0}{2}}{|x_0 - 17| - \frac{34-0}{2} - (|x_0 - 17| - \frac{32-2}{2})} = \frac{|x_0 - 17| - 17}{-17+15} = \frac{|x_0 - 17| - 17}{-2} = \frac{17 - |x_0 - 17|}{2} \tag{14}$$

If $x_0 > 17$ as in our 2D-space problem, then $k(x_0) = \frac{34 - x_0}{2}$, which is consistent with what we got in the 2D-case.

Therefore, a 2D-extension problem involving rectangles is equivalent with two 1D-extension problems. Certainly this equivalence is not valid any longer if instead of rectangles we have more irregular geometrical figures representing factory pieces.

Similarly will be possible for splitting a 3D-application for prisms into three 1D-applications, or into one 2D-application and one 1D-application.

4. **Critical Zone**.

Critical Zone is the region of points where the degree of dependence of a point *P* with respect to a nest of two intervals $k(P) \in (-1, 0)$.

In the above figure, it is all area between the rectangles ABCD and $A_1B_1C_1D_1$.

$A_1B_1C_1D_1$ was constructed by drawing parallels to the sides of the rectangle ABCD, such that:

- The distance between the parallel lines A'D' and AD, be the same with the distance between the parallel lines AD and A_1D_1;
- The distance between the parallel lines A'B' and AB, be the same with the distance between the parallel lines AB and A_1B_1;
- The distance between the parallel lines B'C' and BC, be the same with the distance between the parallel lines BC and B_1C_1;
- The distance between the parallel lines C'D' and CD, be the same with the distance between the parallel lines CD and C_1D_1.

One then extend the construction of a net of included rectangles $A_iB_iC_iD_i \subset A_{i+1}B_{i+1}C_{i+1}D_{i+1}$

and for the points P_{i+l} lying on surface in between the rectangles $A_iB_iC_iD_i$ and $A_{i+1}B_{i+1}C_{i+1}D_{i+1}$ the dependent function $k(P_{i+l}) \in (-i-1, -i)$.

5. **Application in the 3D-space.**

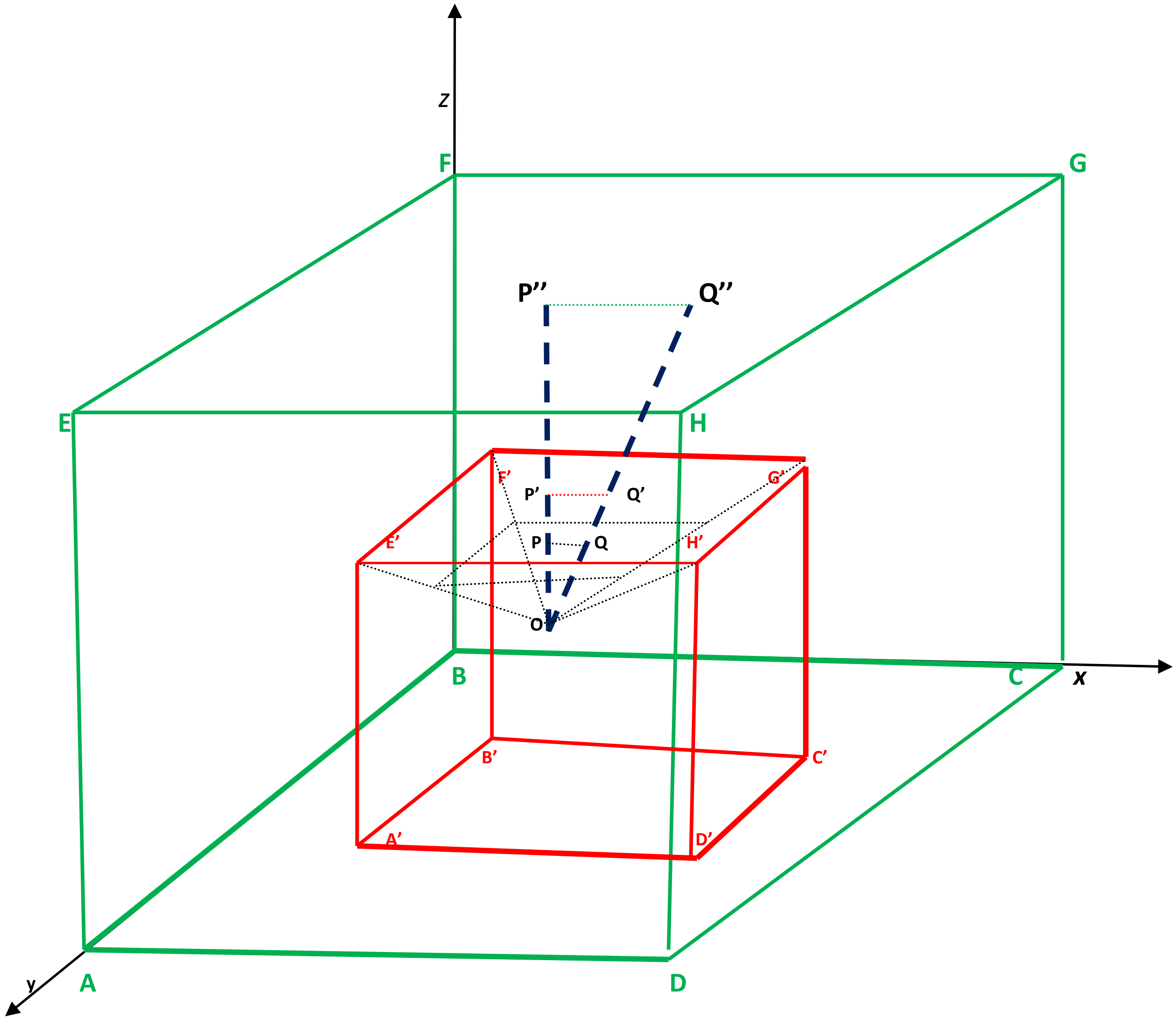

Diagram 4.

A factory piece has the desirable dimensions 20x30x7 but the acceptable factory piece can be 22x34x10 (in centimeters).

The red prism is the desirable form, and the green prism is the acceptable form.

We consider a Cartesian system XYZ and the vertexes of these two prisms are:

A(0,22,0), B(0,0,0), C(34,0,0), D(34,22,0), E(0,22,10), F(0,0,10), G(34,0,10), H(34,22,10);

A'(2,21,3), B'(2,1,3), C'(32,1,3), D'(32,21,3), E'(2,21,7), F'(2,1,7), G'(32,1,7), H'(32,21,7).

O(17,11,5); P(x_0,y_0,z_0), P'(x_1,y_1,7), P''(x_2,y_2,10);

Q(17,11,z_0), Q'(17,11,7), Q''(17,11,10). (15)

The following triangles are similar: $\triangle QOP$, $\triangle Q'OP'$, $\triangle Q''OP''$. Using similarity of triangles, Thales Theorem, and proportionalizations we get that:

$\frac{|PP"|}{|P'P"|} = \frac{|QQ"|}{|Q'Q"|}$ which is equivalent to the equality of dependent function values of $k(P) = k(Q)$, since

$$k(P) = \pm \frac{\rho(P, ABCDEFGH)}{\rho(P, ABCDEFGH) - \rho(P, A'B'C'D'E'F'G'H')} = \pm \frac{|PP"|}{|PP"| - |PP'|} = \pm \frac{|PP"|}{|P'P"|}$$

(16)

and similarly:

$$k(Q) = \pm \frac{\rho(Q, ABCDEFGH)}{\rho(Q, ABCDEFGH) - \rho(Q, A'B'C'D'E'F'G'H')} = \pm \frac{|QQ"|}{|QQ"| - |QQ'|} = \pm \frac{|QQ"|}{|Q'Q"|}.$$

(17)

Therefore, the plane which passes through the point *P* and is parallel with the planes *EFGH* and *E'F'G'H'* (limited by the lines *OE', OF', OG', OH'*) is the locus of points having the same dependent function value.

$k(P) = \frac{z_0 - 10}{3}$ for $z_0 > 5$ and point *P* inside the reversed pyramid *OEFGH*.

6. **The Critical Zone**, whose dependent function of each point in this zone belongs to (-1, 0), will be a larger prism $A_1B_1C_1D_1E_1F_1G_1H_1$ which envelopes the prism *ABCDEFGH* at the same distance from each face as it was between the prisms *A'B'C'D'E'F'G'H'* and *ABCDEFGH*. Therefore, the distance between faces A'B'C'D' and ABCD is the same as the distance between faces ABCD and $A_1B_1C_1D_1$; and the faces A'B'C'D' and ABCD and $A_1B_1C_1D_1$ are parallel. Similarly for all six faces of the prism $A_1B_1C_1D_1E_1F_1G_1H_1$: the distance between faces A'E'H'D' and AEHD is the same as the distance between faces AEHD and $A_1E_1H_1D_1$; and the faces A'E'H'D' and AEHD and $A_1E_1H_1D_1$ are parallel. Etc.

One can construct a net of such prisms:

$A_{i+1}B_{i+1}C_{i+1}D_{i+1}E_{i+1}F_{i+1}G_{i+1}H_{i+1} \supset A_iB_iC_iD_iE_iF_iG_iH_i$ where the value of the dependent function for the points which belong to $Int(A_{i+1}B_{i+1}C_{i+1}D_{i+1}E_{i+1}F_{i+1}G_{i+1}H_{i+1} - A_iB_iC_iD_iE_iF_iG_iH_i)$ is in the interval $(-i-1, -i)$, while for the points lying on the $Fr(A_{i+1}B_{i+1}C_{i+1}D_{i+1}E_{i+1}F_{i+1}G_{i+1}H_{i+1})$ the dependent function is $-i-1$. One considers *ABCDEFGH* as $A_0B_0C_0D_0E_0F_0G_0H_0$, and *A'B'C'D'E'F'G'H'* as $A_{-1}B_{-1}C_{-1}D_{-1}E_{-1}F_{-1}G_{-1}H_{-1}$ for the rule to work for all included prisms.

7. Splitting a 3D-problem into three 1D-problem.

Similarly to the previous 2D-problem, we separately consider the factory piece's width, length, and height.

1) The width of a factory piece is desirable to be 20 cm and acceptable up to 22 cm.
2) And the length of a factory piece is desirable to be 30 cm and acceptable up to 34 cm.
3) And the height of a piece factory is desirable to be 7 cm and acceptable 10 cm.

In the first 1D-problem one makes the diagram:

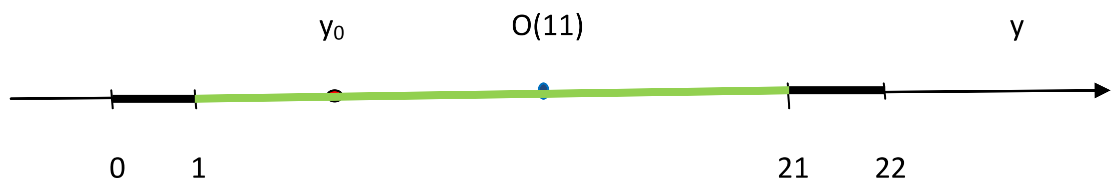

Diagram 5.

One computes, using Prof. Cai Wen's extention 1D-dependent function:

$$k(y_0) = 11 - |y_0 - 11| \qquad (18)$$

In the second 1D-problem one makes the diagram:

Diagram 6.

In the third 1D-problem one makes the diagram:

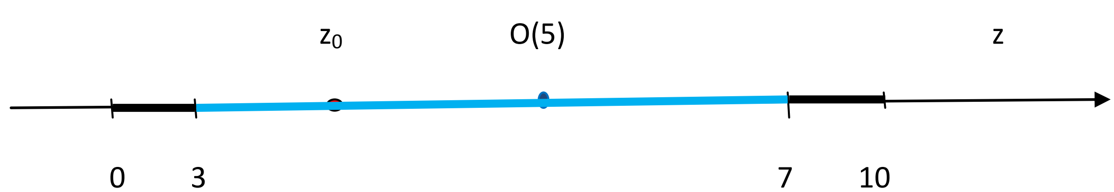

Diagram 7.

One computes, using Prof. Cai Wen's extention 1D-dependent function:

$$k(z_0) = \frac{z_0 - 10}{3} \qquad (19)$$

8. Splitting a 3D-problem into a 2D-problem and a 1D-problem.

Similarly to the previous 2D-problem, we separately consider the factory piece's width, length, and height.

1) The factory 2D-piece is desirable to be 20x30 cm and acceptable up to 22x34 cm.
2) And the height of a piece factory is desirable to be 7 cm and acceptable 10 cm.

9. A 2D-problem which is split into only one 1D-problem.

Assume the desirable circular factory piece radius is 6 cm and acceptable is 8 cm.

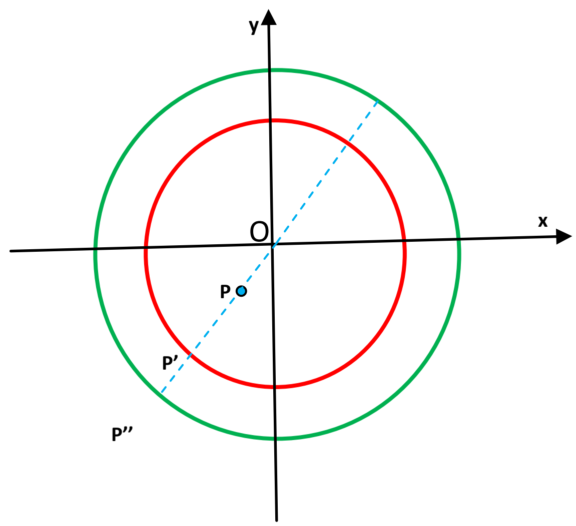

Diagram 8.

It is equivalent to a 1D-problem which has the diagram:

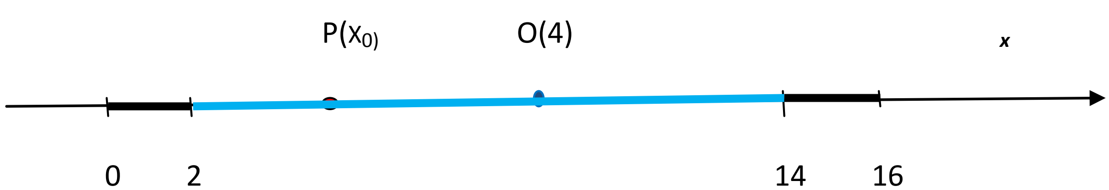

Diagram 9.

One computes, using Prof. Cai Wen's extension 1D-dependent function:

$$k(x_0) = \frac{x_0}{2} \qquad (20)$$

10. A 2D-problem which cannot be split into 1D-problems.

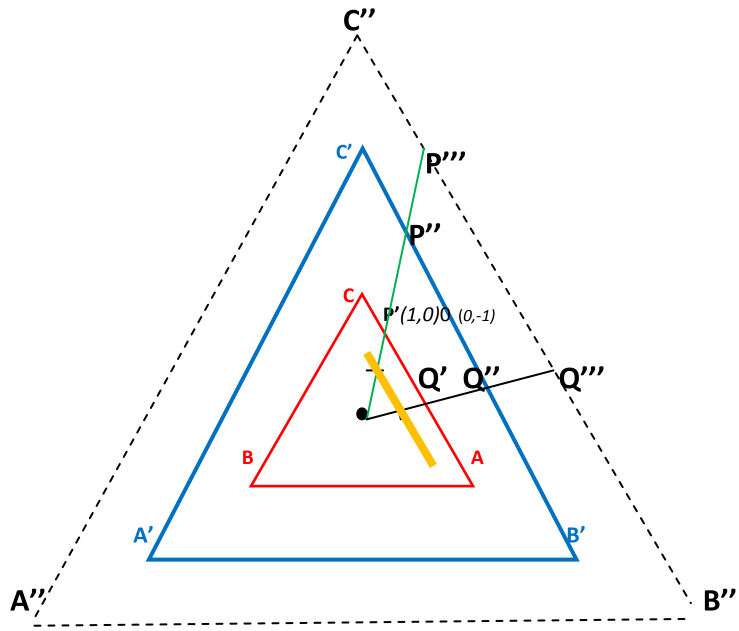

Diagram 10.

11. The **Critical Zone** is between the blue triangle *A'B'C'* and the black dotted triangle *A''B''C''*. Points lying on lines parallel to the red triangle's sides have the same dependence function value (for example the points lying on the orange line segment).

12. Conclusion

In this paper we presented 2D-geometrical figures, such as two nested rectangles, two nested circles, and two nested triangles with no common ending points, and a 3D-geometrical figure, such as the two nested prisms with no common ending points, and we computed the dependent function values for a point with respect to these nested figures.

References:

[1] Cai Wen. Extension Set and Non-Compatible Problems [J]. Journal of Scientific Exploration, 1983, (1): 83-97.

[2] Yang Chunyan, Cai Wen. Extension Engineering [M]. Beijing: Science Press, 2007.

[3] F. Smarandache, Generalizations of the Distance and Dependent Function in Extenics to *2D, 3D*, and *n-D, viXra.org, http://vixra.org/abs/1206.0014 and http://vixra.org/pdf/1206.0014v1.pdf, 2012*.

Generalization of the Dependent Function in Extenics for Nested Sets with Common Endpoints to 2D-Space, 3D-Space, and generally to n-D-Space

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Abstract.

In this paper we extend Prof. Yang Chunyan and Prof. Cai Wen's dependent function of a point *P* with respect to two nested sets $X_0 \subset X$, for the case the sets X_0 and *X* have common ending points, from *1D*-space to *n-D*-space. We give several examples in *2D*- and *3D*-spaces. When computing the dependent function value *k(.)* of the optimal point *O,* we take its maximum possible value.

Formulas for computing *k(O),* and the geometrical determination the Critical Zone are also given.

1. **Principle of Dependent Function** of a point *P(x)* with respect to a nest of two sets $X_0 \subset X$, i.e. *the degree of dependence of point P with respect to the nest of the sets* $X_0 \subset X$*,* is the following.

   The dependent function value, *k(x)*, is computed as follows:

- *the extension distance between the point P and the larger set's closest frontier, divided by the extension distance between the frontiers of the two sets {both extension distances are taken on the line/geodesic that passes through the point P and the optimal/attracting point O};*
- *the dependent function value is positive if point P belongs to the larger set, and negative if point P is outside of the larger set.*

2. **Dependent Function Formula for nested sets having common ending points in 1D-Space.**

For two nested sets $X_0 \subset X$ from the one-dimensional space of real numbers *R*, with X_0 and *X* having common endpoints, the **Dependent Function** *K(x)*, which gives the degree of dependence of a point *x* with respect to this pair of included *1D*-intervals, was defined by Yang Chunyan and Cai Wen in [2] as:

$$K(x)=\begin{cases} \dfrac{\rho(x,X)}{\rho(x,X)-\rho(x,X_0)} & \rho(x,X)-\rho(x,X_0)\neq 0, x\in X \\ -\rho(x,X_0)+1 & \rho(x,X)-\rho(x,X_0)=0, x\in X_0 \\ -\rho(x,X) & \rho(x,X)-\rho(x,X_0)=0, x\notin X_0, x\in X \\ \dfrac{\rho(x,X)}{\rho(x,X)-\rho(x,\hat{X})} & \rho(x,X)-\rho(x,\hat{X})\neq 0, x\in R-X \\ -\rho(x,\hat{X})-1 & \rho(x,X)-\rho(x,\hat{X})=0, x\in R-X \end{cases} \tag{1}$$

where $X_0 = \langle a_0, b_0\rangle$, $X = \langle a, b\rangle$, $\hat{X} = \langle c, d\rangle$, and $X_0 \subset X \subset \hat{X}$.

3. *n-D*-Dependent Function Formula for two nested sets having no common ending points.

The extension *n-D*-dependent function *k(.)* of a point *P*, which represents the degree of dependence of the point *P* with respect to the nest of the two sets $X_0 \subset X$, is:

$$k(P)=\frac{\rho(P,BiggerSet)}{\rho(P,BiggerSet)-\rho(P,SmallerSet)}=\frac{\rho_{nD}(P,X)}{\rho_{nD}(P,X)-\rho_{nD}(P,X_0)}=\pm\frac{|PP_2|}{|PP_2|-|PP_1|}=\pm\frac{|PP_2|}{|P_1P_2|} \tag{2}$$

In other words, the extension *n-D*-dependent function *k(.)* of a point *P* is the *n-D*-extension distance between the point *P* and the closest frontier of the larger set *X*, divided by the *n-D*-extension distance between the frontiers of the two nested sets *X* and X_0; all these n-D-extension distances are taken along the line (or geodesic) *OP*.

4. *n-D*-Dependent Function Formula for two nested sets having common ending points.

We generalize the above formulas (1) and (2) to an ***n-D* Dependent Function** of a point $P(x_1, x_2, \ldots, x_n)$ with respect to the nested sets X_0 and *X* having common endpoints, $X_0 \subset X$, from the universe of discourse *U,* in the *n-D*-space:

$$K_{nD}((x_1,x_2,\ldots,x_n))=\begin{cases} \dfrac{\rho_{nD}((x_1,x_2,\ldots,x_n),X)}{\rho_{nD}((x_1,x_2,\ldots,x_n),X)-\rho_{nD}((x_1,x_2,\ldots,x_n),X_0)} & \rho_{nD}((x_1,x_2,\ldots,x_n),X)-\rho_{nD}((x_1,x_2,\ldots,x_n),X_0)\neq 0, (x_1,x_2,\ldots,x_n)\in U \\ -\rho_{nD}((x_1,x_2,\ldots,x_n),X_0)+1 & \rho_{nD}((x_1,x_2,\ldots,x_n),X)-\rho_{nD}((x_1,x_2,\ldots,x_n),X_0)=0, (x_1,x_2,\ldots,x_n)\in X_0 \\ -\rho_{nD}((x_1,x_2,\ldots,x_n),X) & \rho_{nD}((x_1,x_2,\ldots,x_n),X)-\rho_{nD}((x_1,x_2,\ldots,x_n),X_0)=0, (x_1,x_2,\ldots,x_n)\in U-X_0 \end{cases} \tag{3}$$

5.1. Example 1 of nested rectangles with one common side.

We have a factory piece whose desired *2D*-dimensions should be *20 cm* × *30 cm*, and acceptable *2D*-dimensions *22 cm* × *32 cm*, but the two rectangles have common ending points. We define the

extension *2D*-distance, and then we compute the extension *2D*-dependent function. Let's do an extension *2D*-diagram:

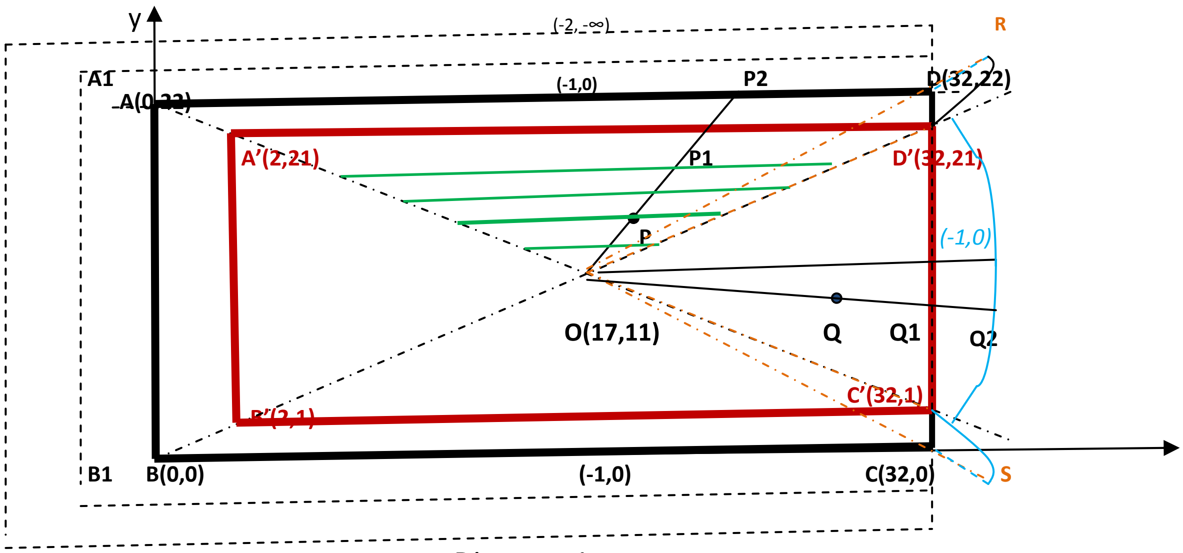

Diagram 1.

The Critical Zone in the top, down, and left sides of the Diagram 1 as the same as for the case when the two pink and black rectangles have no common ending points. But on the right-hand side the Critical Zone is delimitated by the a blue curve in the middle and the blue dotted lines in the upper and lower big rectangle's corners.

The dependent function of the points Q, Q_1, Q_2 is respectively:

$k(Q) = |QQ_1|+1$, and $k(Q_1) = 1$ (if $Q_1 \in A'B'C'D'$) or 0 (if $Q_1 \notin A'B'C'D'$), and $k(Q_2) = -|Q_2Q_1| = -1$, (4)

where $|MN|$ means the geometrical distance between the points M and N.

The dependent function of point P is normally computing:

$$k(P) = \frac{|PP_2|}{|P_1P_2|}. \qquad (5)$$

5.2. Example 2 of nested rectangles with two common sides.

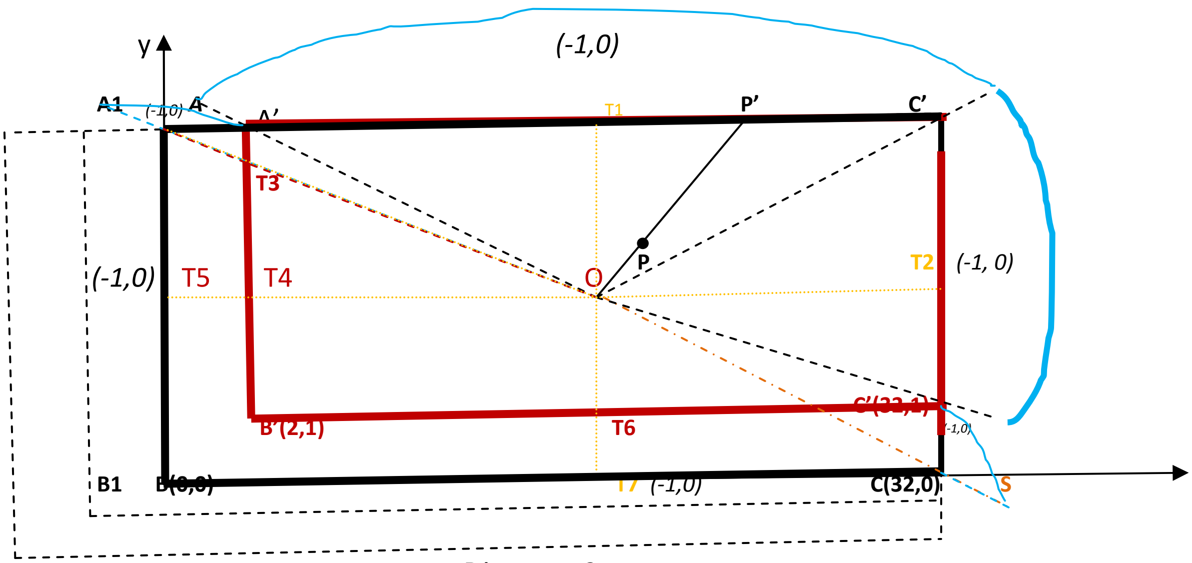

Diagram 2.

We observe that the Critical Zone changes dramatically in the places where the common ending points occur, i.e. on the top and respectively left-hand sides. The Critical Zone is delimitated by blue curves and lines on the top and respectively left-hand sides.

Now, the dependent function of point *P* is different from the Diagram 1:

$$k(P)=|PP'|+1. \tag{6}$$

The dependent function of the optimal point *O* should be the maximum possible value.

Therefore,

$$k(O) = max\ \{|OT_1|+1,\ |OT_2|+1,\ |OP'|+1,\ |OC'|+1,\ \frac{|OT_7|}{|T_6T_7|},\ \frac{|OT_5|}{|T_4T_5|},\ \frac{|OA|}{|T_3A|},\ etc.\ \}. \tag{7}$$

5.3. Example 3 of nested circles with one common ending point.

Assume the desirable circular factory piece radius is *6 cm* and acceptable is *8 cm*, but they have a common ending point *P'*.

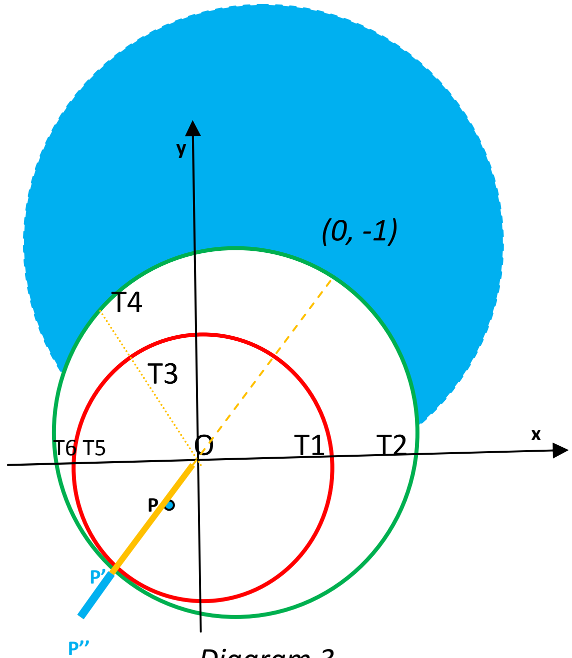

Diagram 3.

The Critical Zone is between the green and blue circles, together with the blue line segment *P''P'* (this line segment resulted from the fact the P' is a common ending point of the red and green circles).

The dependent function values for the following points are:

k(P) =|PP'|+1; *(8)*

k(P') = 1 (if *P'* belongs to the red circle), or *0* (if *P'* does not belong to the red circle); (9)

k(P'') = |P''P'|; *(10)*

k(O) = max {|OP'|+1; $\frac{|OT_4|}{|T_3T_4|}$, (11)

where T_3 lies arbitrary on the red circle, but $T_3 \neq P'$, and T_4 lies on the green circle but T_4 belongs to the line (or geodesic) OT_3}.

5.4. Example 4 of nested triangles with one common bottom side.

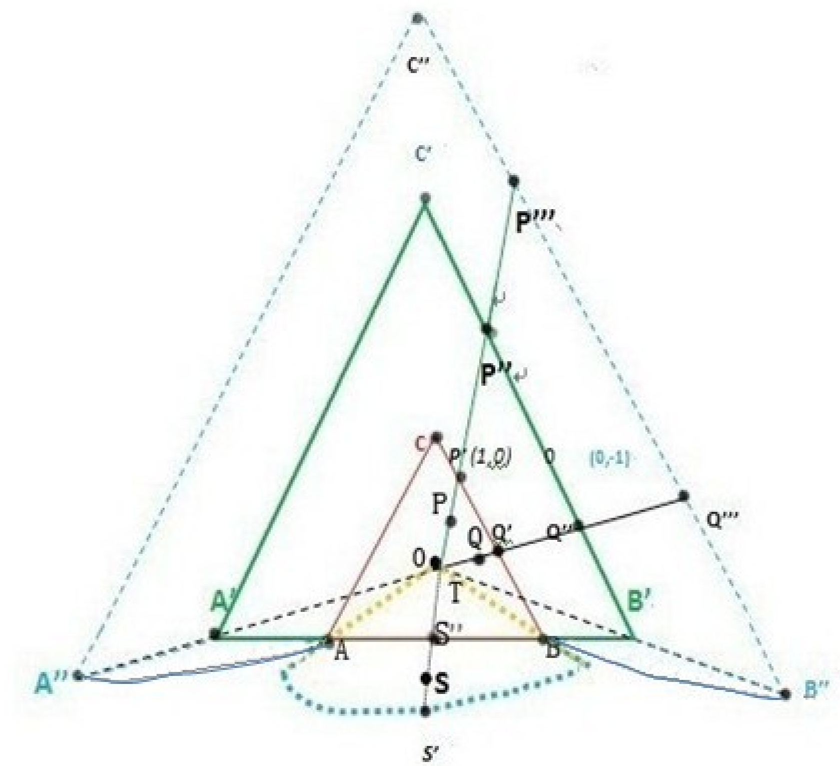

Diagram 4.

The Critical Zone is between the green and blue dotted triangle to the left-hand and right-hand sides, while at the bottom side the Critical Zone is delimitated by the blue curve in the middle and the blue small oval triangles *A''AA'* and respectively *B''BB'*.

The dependent function values of the following points are given below:

$k(P) = \frac{|PP"|}{|P'P"|} > 1$; *k(P')=1; k(P'')=0; k(P''') = -1.* *(12)*

Similarly: $k(Q) = \frac{|QQ"|}{|Q'Q"|} > 1$; *k(Q')=1; k(Q'')=0; k(Q''') = -1.* *(13)*

With respect to the bottom common side (where the line segment *AB* lies on line segment *A'B'*) one has:

*k(T) = |TS''|+1; k(S'') = 1 (*if *S''* belongs to the red triangle *ABC),* or *0 (*if *S''* does not belong to the red triangle *ABC); k(S) = |SS''|; k(S') = -1.* *(14)*

$$k(O) = max\ \{\max_{S''\in[AB]}(|OS''|+1)\ ;\qquad \max_{\substack{P'\in[AC]\cup[CB],P''\in[A'C']\cup[C'B'] \\ P'\in OP'' \\ OPP''\ line/geodesic}}\left(\frac{|OP''|}{|P'P''|}\right)\ \}. \qquad (15)$$

5.5. Example *5* in *3D*-Space of two prisms having a common face.

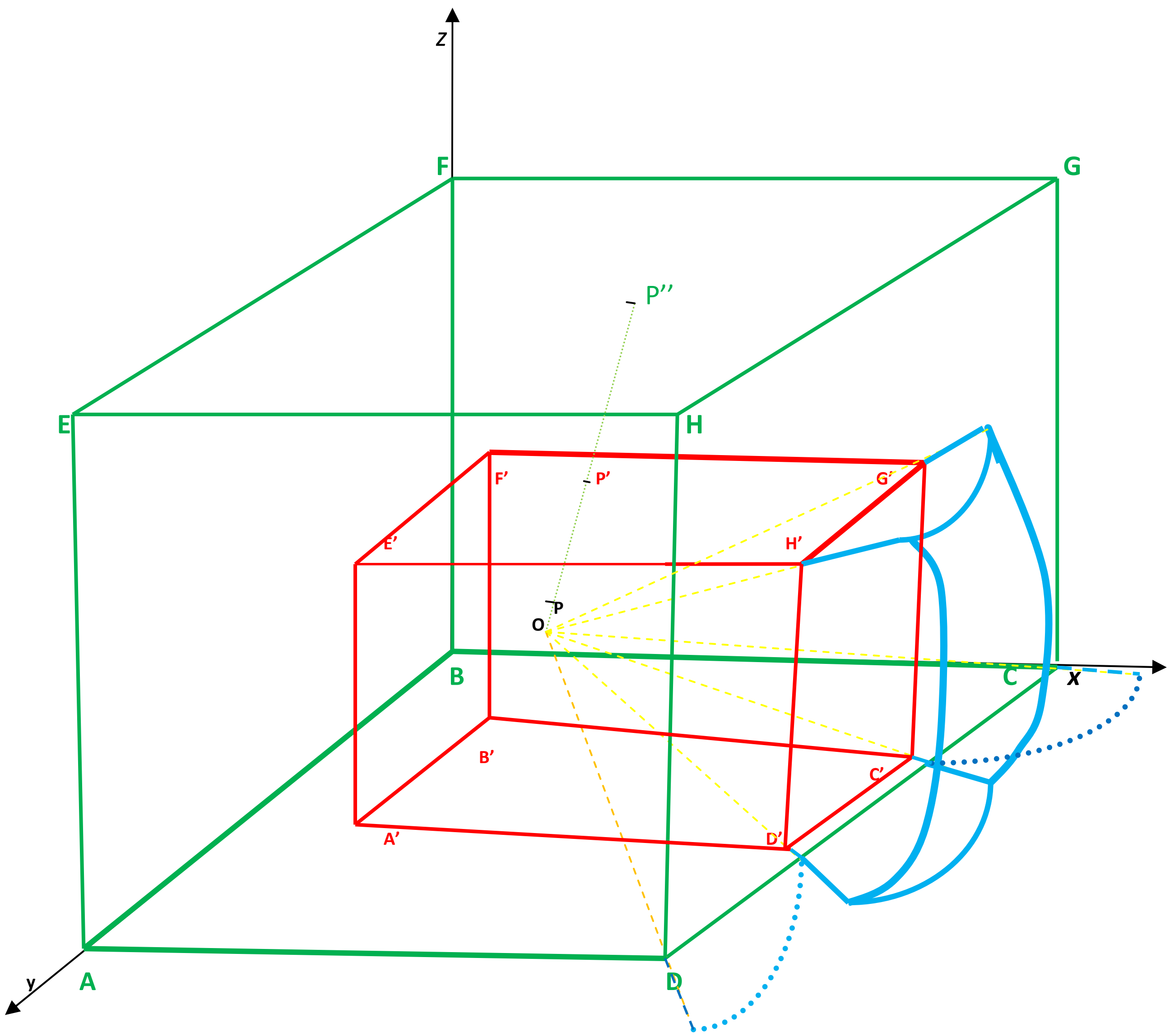

Diagram 5.

The Critical Zone (the zone where the extension dependent function takes values between *0* and *-1*) envelopes the larger green prism *ABCDEFGH* at an equal distance from it as the distance between the red prism *A'B'C'D'E'F'G'H'* and the green prism *ABCDEFGH* with respect to the faces *ABCD, ADHE, BCGF, EFGH,* and *ABFE* (because these green faces and their corresponding

red faces *A'B'C'D', A'D'H'E', B'C'G'F', E'F'G'H',* and respectively *A'B'F'E'* have no common points).

But the green face *DCGH* contains the red face *D'C'G'H'*, therefore for all their common points (i.e. all points inside of and on the rectangle *D'C'G'H'*) the extension dependent function has wild values. *D'C'G'H'* entirely lies on *DCGH*. The Critical Zone related to the right-hand green face *DCGH* and the red face *D'C'G'H'* is the solid bounded by the blue continuous and dashed curves on the right-hand side.

In general, let's consider two *n-D* sets, $S_1 \subset S_2$, that have common ending points (on their frontiers). Let's note by C_E their common ending point zone. Then:

The Dependent Function Formula for computing the value of the Optimal Point O is

$$k(O) = max\,\{\max_{S''\in C_E}(|OS''|+1);\quad \max_{\substack{P'\in Fr(S_1-C_E),\, P''\in Fr(S_2-C_E)\\ P'\in OP''\\ OPP''\ line/geodesic}}\left(\frac{|OP''|}{|P'P''|}\right)\}. \tag{16}$$

We can define the Critical Zone in the sides where there are common ending points as:

$$Z_{C1} = \{P(x) | P\in U\text{-}S_2,\ 0 < d(P,P'')\leq 1,\ P''\in Fr(S_1)\cap Fr(S_2) \text{ and } P''\in OP\}, \tag{17}$$

where $d(P,P'')$ is the classical geometrical distance between the points P and P''.

And for the sides which have no common ending points, the Critical Zone is:

$$Z_{C2} = \{P(x) | P\in U\text{-}S_2,\ 0 < d(P,P'')\leq d(P''P'), \text{ where } P''\in Fr(S_2) \text{ and } P'\in Fr(S_1) \text{ and } P''\in OP\}. \tag{18}$$

Whence, the total Critical Zone is: $Z_C = Z_{C1} \cup Z_{C2}$. *(19)*

References:

[1] Cai Wen. Extension Set and Non-Compatible Problems [J]. Journal of Scientific Exploration, 1983, (1): 83-97.

[2] Yang Chunyan, Cai Wen. Extension Engineering [M]. Beijing: Science Press, 2007.

[3] F. Smarandache, Generalizations of the Distance and Dependent Function in Extenics to *2D, 3D*, and *n-D, viXra.org, http://vixra.org/abs/1206.0014 and http://vixra.org/pdf/1206.0014v1.pdf, 2012*.

[4] F. Smarandache, V. Vlădăreanu, Applications of Extenics to 2D-Space and 3D-Space, viXra.org, http://vixra.org/abs/1206.0043 and http://vixra.org/pdf/1206.0043v2.pdf, 2012.

Generalizations in Extenics of the Location Value and Dependent Function from A Single Finite Interval to *2D*, *3D*, and *n-D* Spaces

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Abstract.
Qiao-Xing Li and Xing-Sen Li [1] have defined in *2011* the Location Value of a Point and the Dependent Function of a Point on a single finite or infinite interval. In this paper we extend their definitions from one dimension (*1D*) to *2D, 3D*, and in general *n-D* spaces.
Several examples are given in *2D* and *3D* spaces.

1. Short Introduction to Extenics.

In this paper we make a short description of Extenics, and then we present an extension of the Location Value of a Point and the Dependent Function of a Point from *1D* to *n-D*, with several examples in the particular cases of *2D* and *3D* spaces. Improvement of the Extenics website is given towards the end, followed by an Extenics what-to-do list.

Extenics is a science initiated by Professor Cai Wen in *1983*. It is at the intersection of mathematics, philosophy, and engineering. Extenics solves contradictory problems. It is based on modeling and remodeling, on transforming and retransforming until getting a reasonable solution to apparently an unreasonable problem.

Extenics solves unconventional and non-traditional problems and finding ingenious, perspicacious and novelty solutions.

Extenics helps in solving problems in hard conditions, incomplete conditions, conflicting conditions. Where mathematics doesn't work, i.e. for inconsistent problems where mathematics says that there is no solution, Extenics does work because it can obtain a solution.

Everything is dynamic; we have dynamic structure, dynamic classification, and dynamic change.

In Extenics a problem may have more solutions, some of them even contradictory with each other, but all of them can be valid solutions.

The five basic transformations are: substitution, increasing/decreasing, expansion/contraction, decomposition, and duplication.

Extenics studies:

- the antithetic properties of the matter: physical part (real) and non-physical part (imaginary), soft and hard parts of the matter, negative and positive parts of the matter;
- unfeasible problems are transformed to feasible problems;
- false propositions are transformed in true propositions;
- wrong inference is transformed into correct inference;
- transform non-conformity to conformity;
- in business non –customers are transformed to customers;
- there are qualitative and quantitative transformations;
- transformation of matter-element, transformation of affair-element, transformation of relation-element;
- transformation of the characteristics;
- one considers transformation of a single part too (not of the whole);
- Extenics deals with unconventional problems which are transformed into conventional;
- inconsistent problems are transformed into consistent;
- also one determines the composability and conductivity of transformations;
- Extenics finds rules and procedures of solving contradictory problems;
- get structures and patterns to deal with contradictions;
- get new methods of solving contradictions;
- reduces the degree of inconsistency of the problems;
- from divergent to less-divergent.

2. Location Value of a Point and the Dependent Function on a Single Finite Interval (on 1D-Space).

Suppose $S = <a, b>$ is a finite interval. By the notation $<a, b>$ one understands any type of interval: open (a, b), closed $[a, b]$, or semi-open/semi-closed $(a, b]$ and $[a, b)$.

a) For any real point $x_0 \in R$, Qiao-Xing Li and Xing-Sen Li have considered

$$D(x_0, S) = a-b \qquad (1)$$

as the <u>location value</u> of point $P(x_0)$ on the single finite interval $<a, b>$.

Of course $D(x_0, S) = D(P, S) < 0$, since $a < b$.

As we can see, a-b is the negative distance between the frontiers of the single finite interval S in the $1D$-space.

b) Afterwards, the above authors defined for any real point $P(x_0)$, with $x_0 \in S$, the elementary dependent function on the single interval S in the following way:

$$k(x_0) = \frac{\rho(x_0, S)}{D(x_0, S)} \qquad (2)$$

where $\rho(x_0, S)$ is the extension distance between point x_0 and the finite interval X in the *1D*-space. Or we can re-write the above formula as:

$$k(P) = \frac{\rho(P, S)}{D(P, S)}. \qquad (3)$$

3. We have introduced in [2] the **Attraction Point Principle**, which is the following:

Let S be a given set in the universe of discourse U, and the optimal point $O \in S$. Then each point $P(x_1, x_2, \dots, x_n)$ from the universe of discourse tends towards, or is attracted by, the optimal point O, because the optimal point O is an ideal of each other point. There could be one or more linearly or non-linearly trajectories (curves) that the same point P may converge on towards O. Let's call all such points' trajectories as the **Network of Attraction Curves (NAC)**.

4. Generalizations of the Location Value of a Point and the Dependent Function on a Single Finite Set on the n-D-Space.

In general, in a universe of discourse U, let's have an *n-D*-set S and a point $P \in U$.

a) The **Generalized Location Value of Point *P* on the Single Finite Set *S* in *n-D* Space,** $D_{nD}(x_0, S)$, is the classical geometric distance (yet taken with a negative sign in front of it) between the set frontiers, distance taken on the line (or in general taken on the curve or geodesic) passing through the optimal point O and the given point P.
In there are many distinct curves passing through both O and P in the Network of Attraction Curves, then one takes that curve for which one gets the maximum geometric distance (and one assigns a negative sign in front of this distance).
We can also denote it as $D_{nD}(P, S)$.

b) We geometrically studied the *1D*-Extension Distance $\rho(x_0, S)$ in our first Extenics paper [2] and we found out that the following principle was used by Prof. Cai Wen in *1983*:

$\rho(x_0, S)$ = the classical geometric distance between the point x_0 and the closest extremity point of the interval <a, b> to it (going in the direction that connects x_0 with the optimal point), distance taken as negative if $x_0 \in$ Int(<a, b>), as positive if $x_0 \in$ Ext(<a, b>), and as zero if
$x_0 \in$ Fr(<a, b>),
where Int(<a, b>) = interior of <a, b>,
Ext(<a, b>) = exterior of <a, b>,
and Fr(<a, b>) = frontier of <a, b>. *(4)*

Thus we have defined the **Generalized Extension Linear/Non-Linear *n-D*-Distance** between point P and set S, as:

$$\rho_{nD}(P,S)=\begin{cases}-\max\limits_{c\in NAC}\ \max\limits_{P'\in Fr(S)} d(P,P';c), & P\neq O, P\in c(OP');\\ \max\limits_{c\in NAC}\ \max\limits_{P'\in Fr(S)} d(P,P';c), & P\neq O, P'\in c(OP);\\ -\max\limits_{c\in NAC, M\in Fr(S), M\in c(O)} d(P,M;c), & P=O.\end{cases} \tag{5}$$

where $\rho_{nD}(P,S)$ means the extension distance as measured along the curve *c* in the *n-D* space;
O is the optimal point (or non-linearly attraction point);
the points are attracting by the optimal point *O* on trajectories described by an injective curve *c*;
d(P,P';c) means the non-linearly *n-D*-distance between two points *P* and *P'* along the curve *c*, or the arclength of the curve *c* between the points *P* and *P'*;
Fr(S) means the frontier of set *S*;
and c(*OP')* means the curve segment between the points *O* and *P'* (the extremity points *O* and *P'* included), therefore *P*∈ *c(OP')* means that *P* lies on the curve *c* in between the points *O* and *P'*.
For *P* coinciding with *O*, one defined the distance between the optimal point *O* and the set *S* as the negatively maximum curvilinear distance (to be in concordance with the *1D*-definition).
In the same way, if there are many curves, *c* in the Network of Attraction Curves, passing through both *O* and *P,* then one chooses that curve which maximizes the geometric distance.

We do these maximizations in order to be consistent with the case when the point *P* coincides with the optimal point *O*.

We now proceed to defining the **Generalized Dependent Function on a Single Finite Set *S* in *n-D*-Space of Point *P***:

$$k_{nD}(P)=\max_{c\in NAC}\frac{\rho_{nD}(P,S;c)}{D_{nD}(P,S;c)} \tag{6}$$

or using words: the Generalized Dependent Function on a Single Finite Set *S* of point *P* is the geometric distance between point *P* and the closest frontier on the line (or in general on the curve/geodesic c that connects *P* with the optimal point *O)* in the same side of the optimal point, divided by the distance [taken along the line (or in general on the curve/geodesic c that connects P with the optimal point *O*)] between the set frontiers.
If there are more curves passing through *P* and *O*, then one takes that curve which maximizes the value of $k_{nD}(P)$.

5. Examples of 2D-Dependent Function on a Single Finite Set.

Let's retake a previous example with two rectangles, $A_0M_0B_0N_0$ and *AMBN,* whose sides are parallel to the axes of the Cartesian system of coordinates, such that they have no common end points, and $A_0M_0B_0N_0 \subset AMBN$. The optimal point is *O* located in their center of symmetry.

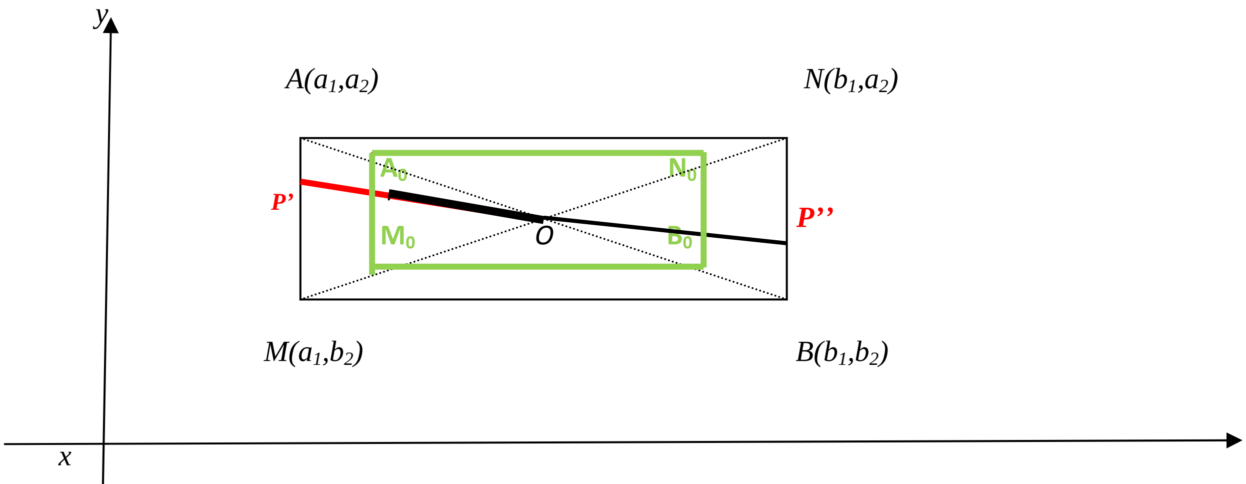

Fig. 1. The small rectangle shrinks until it vanishes.

If there is only a single finite set *AMBN*, this means that the other set $A_0M_0B_0N_0$ (which is included in *AMBN*) is shrinking little by little until it vanishing, thus the *(0, 1)* value of the dependent function of two nested sets increases until occupying the whole interior of the big set *AMBN*:

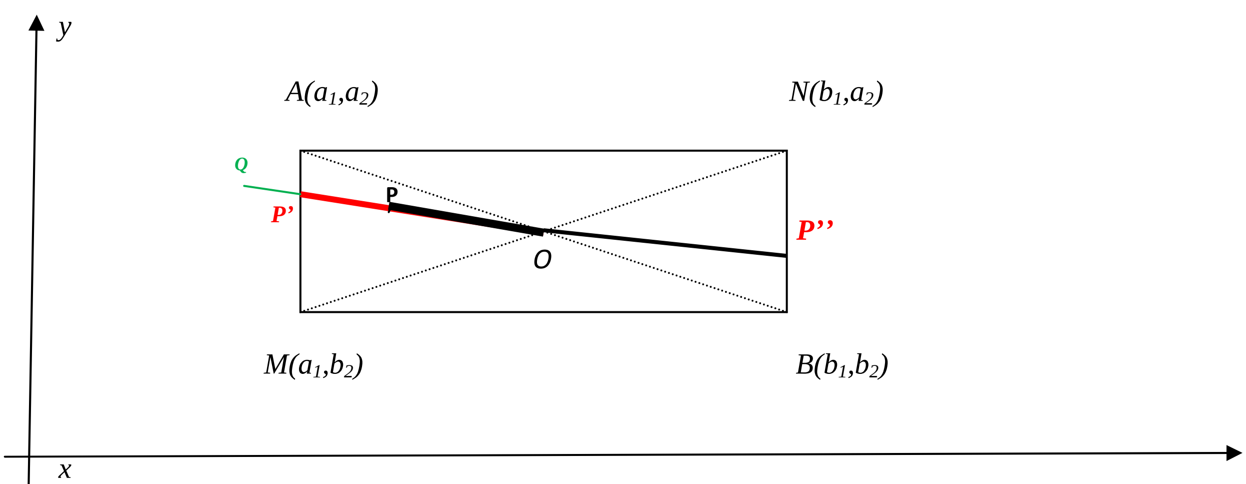

Fig. 2. The Dependent Function of a Point on a Single Rectangle.

The dependent function of interior point *P* with respect to the single rectangle *AMBN* is:

$$k(P) = +\frac{|PP'|}{|P''P'|} \tag{7}$$

i.e. the distance between P and the closest frontier of the rectangle *{ =|PP'| }*, divided by the distance between the frontiers of the rectangle *{ =|P''P| }*.

The dependent function of exterior point *Q* with respect to the single rectangle *AMBN* is:

$$k(Q) = -\frac{|QP'|}{|P''P'|}. \tag{8}$$

And the dependent function of frontier point *P'* with respect to the single rectangle *AMBN* is:

$$k(P') = \frac{|P'P'|}{|P''P'|} = 0. \tag{9}$$

In this example we have considered only one curve of convergence for each point in the Network of Attraction Curves.

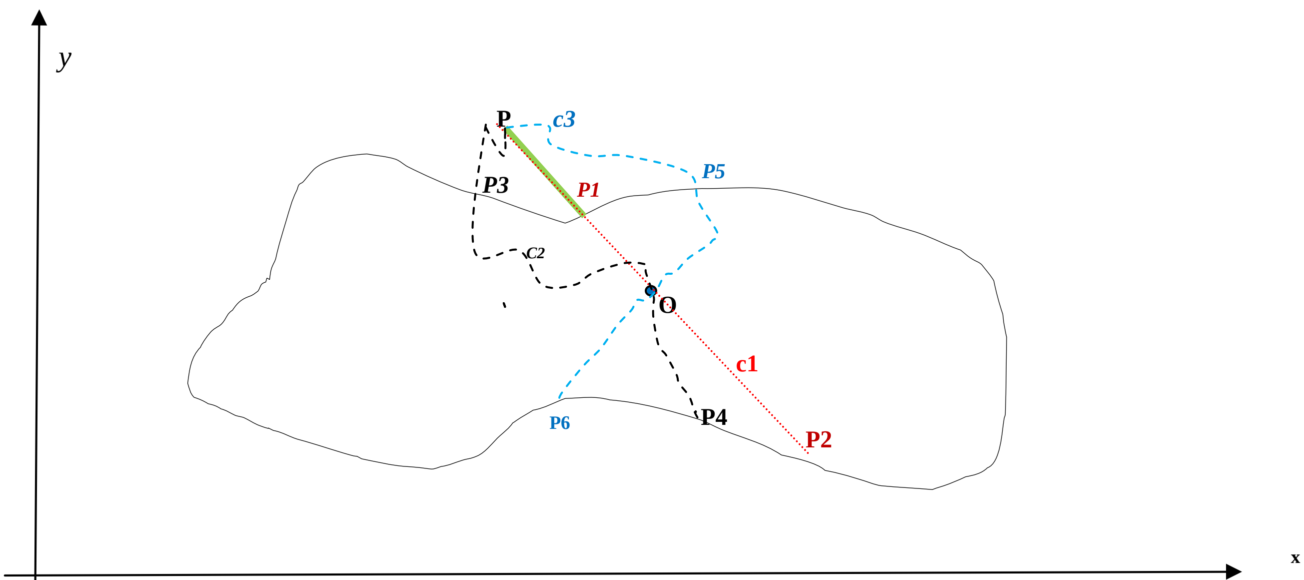

Fig. 3. The dependent function value of point P with respect with an arbitrary 2D finite set, when there are more attraction curves from P to the optimal point O

The dependent function value of point *P* is:

$$k(P) = -\max\{\frac{c1(PP1)}{c1(P1P2)} = \frac{|PP1|}{|P1P2|}, \frac{c2(PP3)}{|c2(P3P4)}, \frac{c3(PP5)}{c3(P5P6)}\} \tag{10}$$

where *c1(PP1)* means the arclength between the points *P* and *P1* on the curve *c1* (which happens in this case to be just a line segment), and similarly *c2(.,.)* and *c3(.,.)*.

6. Example of 3D-Dependent Function on a Single Finite Set.

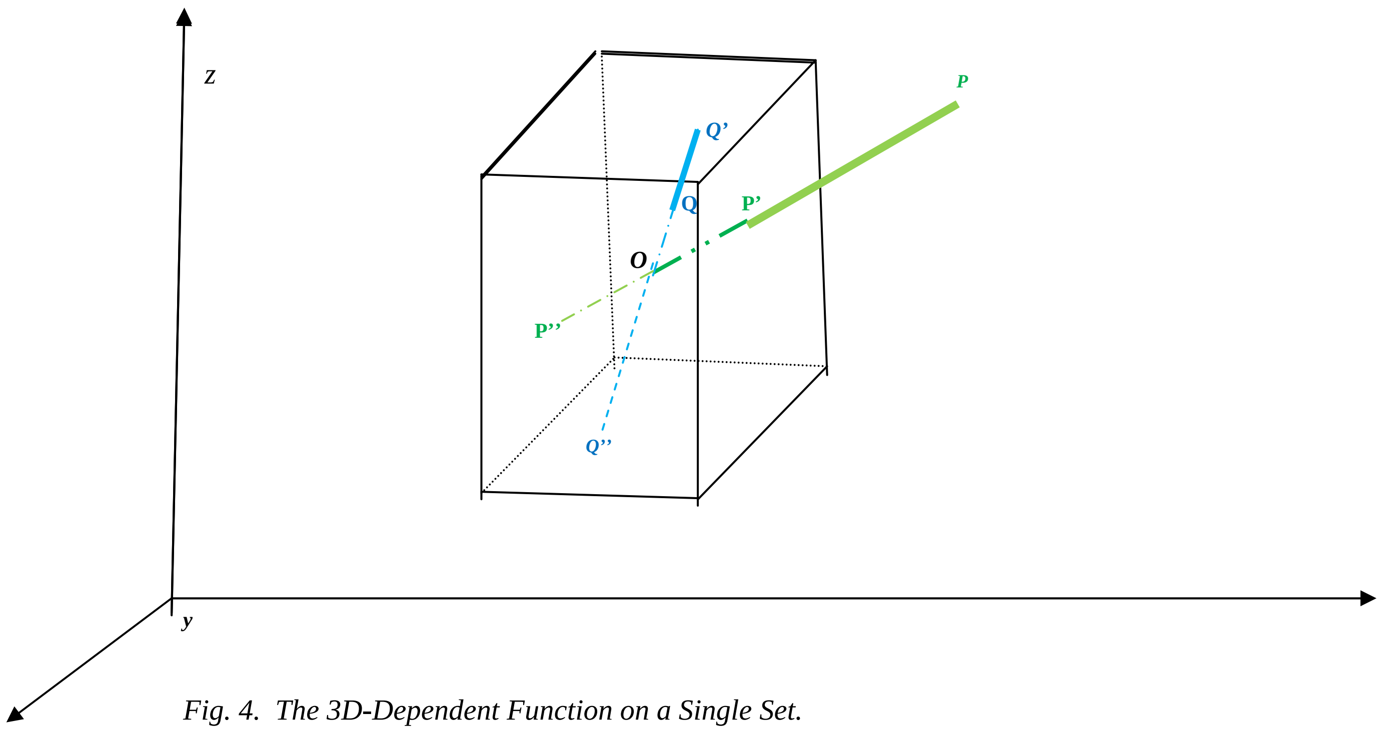

Fig. 4. The 3D-Dependent Function on a Single Set.

The dependent values on the single 3D-set is calculated for the following points:

$$k(P) = -\frac{|PP'|}{|P''P'|}, k(Q) = +\frac{|QQ'|}{|Q''Q'|}, k(P') = k(Q') = 0. \tag{11}$$

7. Extenics Web Development.

Web Developer Mihai Liviu Smarandache worked for the Research Institute of Extenics and Innovation Methods, the Guangdong University of Technology, from Guangzhou, P. R. China, in August 2012, together with Prof. Cai Wen, Prof. Xingsen Li, Prof. Weihua Li, Prof. Xiaomei Li, Prof. Yang Chunyan, Prof. Li Qiao-Xing, Prof. Florentin Smarandache, Research Assistant Jianming Li, and graduate student Zhiming Li.

a) He proposed the improvement of the Extenics website's layout to provide a better user experience. Currently, the Extenics website has many articles that the user can click on and that will show up on the page. If the user wants to save or print the articles they will have to copy and paste the article text into Microsoft Word and print.
   The new layout gives the user the ability to click on the article and have it export directly to a *pdf* file for easy processing (saving/printing).
   The new layout also provides a contact Extenics page where the user can send a direct email to the Extenics department.
b) He proposed the including of an interactive Tutorial on Extenics, so more people around the globe learn about it. The tutorial can have games that the user can play as part of the

Extenics learning. The tutorial can also include tests to test the user to see how much they have learned.

c) He proposed an Automatic Email Sending, such that when new Extenics publications, presentations, conferences, events occur an automatic email system will send the new information to all Extenics members.

   He wrote the code and incorporated it into the Extenics control panel, but the *php* mail function was not supported. He checked the version of *php* installed on the server and it was *5.2*, which is a very old version. He suspected that this could be the problem as to why the emails are not working.

d) He also proposed a Calendar of Extenics Events to be incorporated to the Extenics website. This calendar can let an Extenics administrator add important upcoming events from a control panel. The user can visit the Extenics website and click on the calendar and view the events. If a user chooses to do so, the website can send email reminders about these events.

8. Extenics What-to-do List.

- So far there have been done applications of Extenics in one-dimensional space. Now there are needed generalizations of the applications of Extenics in *2D, 3D*, and in general in *n-D* spaces in all previous fields done in *1D* space: i.e. in data mining, control theory, management, design, information theory, etc.

  One has to use the <u>*n-D* extension distance</u> between a point and a set, and the <u>*n-D* extension dependent function</u> of a point with respect to a nested set without common ending points and with common ending points.
- Single infinite interval dependent function to be generalized from one-dimensional space to *2D, 3D* and in general *n-D* spaces.
- Applications of Extenics if possible in new fields not yet approached in the one-dimensional space yet, such as: in physics, chemistry, biology, geology, etc.
- More software related to Extenics.
- Tutorials related to Extenics.
- Improving the Extenics website. Introducing the automatic email.

  Also, adding more papers and books (especially in English) to the Extenics website.

Acknowledgement.

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References:

[1] Qiao-Xing Li and Xing-Sen Li, *The Method to Construct Elementary Dependent Function on Single Interval*, Key Engineering Materials Vols. 474-476 (2011), pp. 651-654, www.scientific.net.

[2] Florentin Smarandache, *Generalizations of the Distance and Dependent Function in Extenics to 2D, 3D, and n-D*, "Global Journal of Science Frontier Research (GJSFR)" [USA, U.K., India], Vol. 12, Issue 8, pp. 47-60, 2012;

and in "Progress in Physics", University of New Mexico, USA, Vol. 3, pp. 54-61, 2012.

[3] Cai Wen. *Extension Set and Non-Compatible Problems* [J]. Journal of Scientific Exploration, 1983, (1): 83-97;

also Cai Wen. *Extension Set and Non-Compatible Problems* [A]. Advances in Applied Mathematics and Mechanics in China [C]. Peking: International Academic Publishers, 1990.1-21.

[4] Yang Chunyan, Cai Wen. *Extension Engineering* [M]. Beijing: Science Press, 2007.

[5] Wu Wenjun et al. *"Research on Extension theory and its application" Expert Opinion*. 2004, 2; http://web.gdut.edu.cn/~extenics/jianding.htm.

[6] Y. Xu and Q.X. Zhu: *An intelligent operation optimization method for process industry based on extension theory and its application*. CIESC Journal, Vol. 60 (10) (2009), p. 2536-2542 (in Chinese).

[7] X.R. Duan, Y.N. Yan and X.M. Zhu: *Synthetically evaluation of RMS based on extension theory. Machinery Design and Manufacture*, Vol. (1) (2010), p. 125-127 (in Chinese).

[8] C.B. Li, Q.L. Wang and F. Liu, etc.: *Program design for green manufacturing implementation based on extension theory*. China Mechanical Engineering, Vol. 21(1) (2010), p. 71-75 (in Chinese).

[9] W. Cai and Y. Shi: *Extenics: its significance in science and prospects in application*. Journal of Harbin Institute of Technology, Vol. 38(7) (2006), p. 1079-1087 (in Chinese).

[10] J. Chen and S.Y. Zhang: *Product regenerative design based on tentative design chain*. Computer Integrated Manufacturing, Vol. 15(2) (2009), p. 234-239 (in Chinese).

[11] Q.X. Li and S.F. Liu: *A method to construct the general location value and general elementary dependent function*. Systems Engineering, Vol. 24(6) (2006), p. 116-118 (in Chinese).

[12] Q.X. Li and S.F. Liu: *The method to construct interval general elementary dependent function*. Systems Engeering----Theory and Practice， Vol. (6) (2007), p. 173-176 (in Chinese).

[13] Q.X. Li: *The method to construct elementary dependent function based on infinite interval*. Mathematics in Practice and Theory, Vol. 39(4) (2009), p. 142-146 (in Chinese).

[14] Q.X. Li and S.F. Liu: *The method to construct interval elementary dependent function based on the interval distance and side-distance*. Journal of Harbin Institute of Technology, Vol. 38(7) (2006), p. 1097-1100 (in Chinese).

[15] C.Y. Yang and W. Cai: *Extension engineering* (Science Press, China 2007) (in Chinese).

Extention Transformation Used in I Ching

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Abstract.

In this paper we show how to using the *extension transformation* in *I Ching* in order to transforming a hexagram to another one. Each binary hexagram (and similarly the previous trigram) has a degree of *Yang* and a degree of *Yin*. As in neutrosophic logic and set, for each hexagram <*H*> there is corresponding an opposite hexagram <*antiH*>, while in between them all other hexagrams are neutralities denoted by <*neutH*>*;* a neutrality has a degree of <*H*> and a degree of <*antiH*>.

A generalization of the trigram (which has three stacked horizontal lines) and hexagram (which has six stacked horizontal lines) to *n*-gram (which has *n* stacked horizontal lines) is provided. Instead of stacked horizontal lines one can consider stacked vertical lines - without changing the composition of the trigram/hexagram/n-gram. Afterwards, circular representations of the hexagrams and of the *n*-grams are given.

1. Introduction.

“I Ching”, which means *The Book of Changes*, is one of the oldest classical Chinese texts. It is formed of *64* hexagrams.

In this paper we are referring to *I Ching* used in the Chinese culture and philosophy only, not the divinization. According to *I Ching* everything is in a continuous change.

At the beginning, between *2800-2737 BC*, originating with the culture hero Fu Xi, there have been *8* trigrams, and within the time of the legendary Yu *(2194-2149 BC)* the trigrams were expanded into *64* hexagrams.

Each trigram was formed by three stacked horizontal lines. Then two trigrams formed a hexagram.

Therefore a hexagram is formed by six stacked horizontal lines; and each stacked horizontal line is either unbroken line (———), called **Yang**, or broken line (— —), called **Yin**.

Yang is associated with MALE, positive, giving, creation, digit *1*, and Yin is associated with FEMALE, negative, receiving, reception, digit *0* in the Taoist philosophy. In Taoism, Yang and Yin complement each other, like in the *taijitu* symbol:

Figure 1

The number of all possible trigrams formed with unbroken or broken lines is $2^3 = 8$.

And the number of all possible hexagrams also formed with unbroken or broken lines is

$2^6 = 64$.

A hexagram is formed by two trigrams: the first trigram (first three lines) is called *lower trigram* and represents the inner aspect of the change, while the second trigram (last three lines) is called *upper trigram* and represents the outer aspect of the change.

2. Analyzing the Hexagrams

As in neutrosophy (which is a philosophy that studies the nature of entities, their opposites, and the neutralities in between them), we have the following for the *I Ching* hexagrams:

- To each hexagram <*H*> an anti-hexagram <*antiH*> is corresponding, and *62* neutral hexagrams <*neutH*> are in between <*H*> and <*antiH*>.
- Each <*neutH*> has a degree of <*H*> and a degree of <*antiH*>. The degrees are among the numbers *1/6, 2/6, 3/6, 4/6, 5/6* and the sum of the degree of <*H*> and degree of <*antiH*> is *1*.
- Let's note the *62* neutral hexagrams by <$neutH_1$>, <$neutH_2$>, …, <$neutH_{62}$>. For each neutral hexagram <$neutH_i$> there is a neutral hexagram <$neutH_j$>, with $i \neq j$, which is the opposite of it.
- For each stacked horizontal line the **extension transformation** is the following:

$$T: \{Yang, Yin\} \rightarrow \{Yang, Yin\}$$

$T(x) = \bar{x}$, where $\bar{x}$ is the opposite of x,

i.e.

T(Yang) = Yin or *T(*———*) =* — —

and

T(Yin) = Yang or *T(*— —*) =* ———

To transform a hexagram into another hexagram one uses this extension transformation once, twice, three times, four times, five, or six times. The maximum number of extension transformations used (six) occurs when we transform a hexagram into its opposite hexagram.

3. **Hexagram Table**.

The below Hexagram Table is taken from Internet (*[1]* and *[2]*); instead of stacked horizontal lines one considers stacked vertical lines - without affecting the results of this article.

In this table one shows the modern interpretation of each hexagram, which is a retranslation of Richard Wilhelm's translation.

Hexagram Table

Hexagram	**Modern Interpretation**
01. |||||| Force (乾 qián)	Possessing Creative Power & Skill
02. ¦¦¦¦¦¦ Field (坤 kūn)	Needing Knowledge & Skill; Do not force matters and go with the flow
03. |¦¦¦|¦ Sprouting (屯 zhūn)	Sprouting
04. ¦|¦¦¦| Enveloping (蒙 méng)	Detained, Enveloped and Inexperienced
05. |||¦|¦ Attending (需 xū)	Uninvolvement (Wait for now), Nourishment
06. ¦|¦||| Arguing (訟 sòng)	Engagement in Conflict
07. ¦|¦¦¦¦ Leading (師 shī)	Bringing Together, Teamwork http://en.wikipedia.org/wiki/I_Ching - cite_note-ichdm-21
08. ¦¦¦¦|¦ Grouping (比 bǐ)	Union
09. |||¦|| Small Accumulating (小畜 xiǎo chù)	Accumulating Resources
10. ||¦||| Treading (履 lǚ)	Continuing with Alertness
11. |||¦¦¦ Pervading (泰 tài)	Pervading
12. ¦¦¦||| Obstruction (否 pǐ)	Stagnation
13. |¦|||| Concording People (同人 tóng rén)	Fellowship, Partnership
14. ||||¦| Great Possessing (大有 dà yǒu)	Independence, Freedom
15. ¦¦|¦¦¦ Humbling (謙 qiān)	Being Reserved, Refraining
16. ¦¦¦|¦¦ Providing-For (豫 yù)	Inducement, New Stimulus
17. |¦¦||¦ Following (隨 suí)	Following
18. ¦||¦¦| Corrupting (蠱 gǔ)	Repairing
19. ||¦¦¦¦ Nearing (臨 lín)	Approaching Goal, Arriving http://en.wikipedia.org/wiki/I_Ching - cite_note-cigic-23

20. ䷓ Viewing (觀 guān)	The Withholding
21. ䷔ Gnawing Bite (噬嗑 shì kè)	Deciding
22. ䷕ Adorning (賁 bì)	Embellishing
23. ䷖ Stripping (剝 bō)	Stripping, Flaying
24. ䷗ Returning (復 fù)	Returning
25. ䷘ Without Embroiling (無妄 wú wàng)	Without Rashness
26. ䷙ Great Accumulating (大畜 dà chù)	Accumulating Wisdom
27. ䷚ Swallowing (頤 yí)	Seeking Nourishment
28. ䷛ Great Exceeding (大過 dà guò)	Great Surpassing
29. ䷜ Gorge (坎 kǎn)	Darkness, Gorge
30. ䷝ Radiance (離 lí)	Clinging, Attachment
31. ䷞ Conjoining (咸 xián)	Attraction
32. ䷟ Persevering (恆 héng)	Perseverance
Hexagram	**Modern Interpretation**
33. ䷠ Retiring (遯 dùn)	Withdrawing
34. ䷡ Great Invigorating (大壯 dà zhuàng)	Great Boldness
35. ䷢ Prospering (晉 jìn)	Expansion, Promotion
36. ䷣ Brightness Hiding (明夷 míng yí)	Brilliance Injured
37. ䷤ Dwelling People (家人 jiā rén)	Family
38. ䷥ Polarising (睽 kuí)	Division, Divergence
39. ䷦ Limping (蹇 jiǎn)	Halting, Hardship
40. ䷧ Taking-Apart (解 xiè)	Liberation, Solution
41. ䷨ Diminishing (損 sǔn)	Decrease
42. ䷩ Augmenting (益 yì)	Increase
43. ䷪ Parting (夬 guài)	Separation
44. ䷫ Coupling (姤 gòu)	Encountering
45. ䷬ Clustering (萃 cuì)	Association, Companionship
46. ䷭ Ascending (升 shēng)	Growing Upward
47. ䷮ Confining (困 kùn)	Exhaustion

48. ¦||¦|¦ Welling (井 jǐng)	Replenishing, Renewal
49. |¦|||¦ Skinning (革 gé)	Abolishing the Old
50. ¦|||¦| Holding (鼎 dǐng)	Establishing the New
51. |¦¦|¦¦ Shake (震 zhèn)	Mobilizing
52. ¦¦|¦¦| Bound (艮 gèn)	Immobility
53. ¦¦|¦|| Infiltrating (漸 jiàn)	Auspicious Outlook, Infiltration
54. ||¦|¦¦ Converting The Maiden (歸妹 guī mèi)	Marrying
55. |¦||¦¦ Abounding (豐 fēng)	Goal Reached, Ambition Achieved
56. ¦¦||¦| Sojourning (旅 lǚ)	Travel
57. ¦||¦|| Ground (巽 xùn)	Subtle Influence
58. ||¦||¦ Open (兌 duì)	Overt Influence
59. ¦|¦¦|| Dispersing (渙 huàn)	Dispersal
60. ||¦¦|¦ Articulating (節 jié)	Discipline
61. ||¦¦|| Centre Confirming (中孚 zhōng fú)	Staying Focused, Avoid Misrepresentation
62. ¦¦||¦¦ Small Exceeding (小過 xiǎo guò)	Small Surpassing
63. |¦|¦|¦ Already Fording (既濟 jì jì)	Completion
64. ¦|¦|¦| Not-Yet Fording (未濟 wèi jì)	Incompletion

4. Examples of Extension Transformations used for Hexagrams.

As an example of studying the above Hexagram Table, let's take the first hexagram and denote it by

$$<H> = ||||||$$

Then its opposite diagram happened to be its second hexagram:

$$<antiH> = ¦¦¦¦¦¦$$

Their modern interpretation is consistent with them, since <*H*> means "Possessing Creative Power & Skill", while <*antiH*> means the opposite, i.e. "Needing Knowledge & Skill" (because <*antiH*> doesn't have knowledge and skills).

Hexagram <*H*> is known as "Force", while <*antiH*> as "Field", or the Force works the Field.

As in Extenics founded and developed by Cai Wen [3, 4], to transform <*H*> into <*antiH*> one uses the extension transformation *T(Yang)=Yin* six times (for each stacked vertical line). The other *62* hexagrams have a percentage of <*H*> and a percentage of <*antiH*>.

There are:

$C_6^0 = 1$ hexagram that has *6/6 = 100%* percentage of <*H*> and *0/6 = 0%* percentage of <*antiH*>*;*

$C_6^1 = 6$ hexagrams that have *5/6* percentage of <*H*> and *1/6* percentage of <*antiH*>*;*

$C_6^2 = 15$ hexagrams that have *4/6* percentage of <*H*> and *2/6* percentage of <*antiH*>*;*

$C_6^3 = 20$ hexagrams that have *3/6* percentage of <*H*> and *3/6* percentage of <*antiH*>*;*

$C_6^4 = 15$ hexagrams that have *2/6* percentage of <*H*> and *4/6* percentage of <*antiH*>*;*

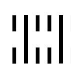
$C_6^5 = 6$ hexagrams that have *1/6* percentage of <*H*> and *5/6* percentage of <*antiH*>*;*

$C_6^6 = 1$ hexagram that has *0/6 = 0%* percentage of <*H*> and *6/6 = 100%* percentage of <*antiH*>.

The total number of hexagrams is:

$$\sum_{k=0}^{6} C_6^k = (1+1)^6 = 1+6+15+20+15+6+1 = 64\,.$$

For the following neutral hexagram ("Gorge")

<*neutH₂₉*> = 

its opposite is another neutral hexagram ("Radiance")

<*neutH₃₀*> = .

<*neutH₂₉*> can be obtained from the hexagram <*H*> by using four times the extension transformation *T(Yang) = Yin* for the first, third, fourth, and sixth stacked vertical lines.

Hexagram <*neutH₂₉*> is *2/6 = 33%* <*H*> and *4/6 = 67%* <*antiH*>.

$<neutH_{30}>$ can be obtained from the hexagram $<H>$ by using two times the extension transformation *T(Yang) = Yin* for the second, and fifth stacked vertical lines.

Hexagram $<neutH_{30}>$ is $4/6 = 67\%$ $<H>$ and $2/6 = 33\%$ $<antiH>$.

5. Circular Representation of the Hexagrams.

Shao Yung in the 11^{th} century has displayed the hexagrams in the formats of a circle and of a rectangle.

We represent the hexagrams in the format of a circle, but such that each hexagram $<H_i>$ is diametrically opposed to its opposite hexagram $<antiH_i>$. We may start with any hexagram $<H_0>$ as the main one:

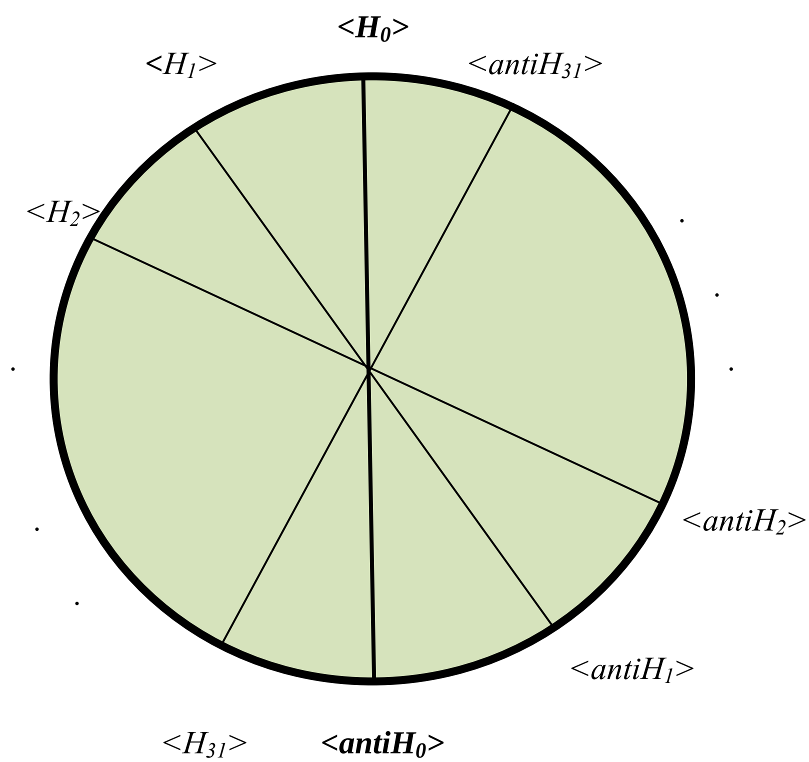


Figure 2

6. Generalization of Hexa-grams to n-grams.

The *3-gram* (or *trigram*) and the *6-gram* (or *hexagram*) can be generalized to an *n-gram*, where n is an integer greater than *1*.
We define the ***n*-gram** as formed by n stacked horizontal lines; and each stacked horizontal line is either unbroken line (———), called **Yang**, or broken line (— —) , called **Yin**.

Therefore we talk about binary *n*-grams.

The number of all possible binary *n*-grams is equal to 2^n.

Similarly to hexagrams we have:

- To each *n-gram* <*G*> an anti-n-gram <*antiG*> is corresponding, and $2^n - 2$ neutral n-grams <*neutG*> are in between <*G*> and <*antiG*>.
- Each <*neutG*> has a degree of <*G*> and a degree of <*antiG*>. The degrees are among the numbers *1/n, 2/n, ..., (n-1)/n* and the sum of the degree of <*G*> and degree of <*antiG*> is *1*.
- Let's note the $2^n - 2$ neutral *n*-grams by $<neutG_1>, <neutG_2>, \ldots, <neutG_{2^n-1}>$. For each neutral *n*-gram $<neutG_i>$ there is a neutral *n*-gram $<neutG_j>$, with $i \neq j$, which is the opposite of it.
- For each stacked horizontal line the **extension transformation** is the same:

T: {Yang, Yin} → *{Yang, Yin}*

$T(x) = \bar{x}$, where $\bar{x}$ is the opposite of x,

i.e.

T(Yang) = Yin or *T(*———*)* = — —

and

T(Yin) = Yang or *T(*— —*)* = ———

To transform an *n*-gram into another n-gram one uses this extension transformation once, twice, three times, and so forth up to $2^n - 2$ times. The maximum number of extension transformations used ($2^n - 2$) occurs when we transform an *n*-gram into its opposite *n*-gram.

To transform an *n*-gram <*G*> into its opposite <*antiG*> one uses the extension transformation *T(Yang)=Yin* 2^n times (for each stacked vertical line). The other $2^n - 2$ *n*-grams have a percentage of <*G*> and a percentage of <*antiG*>.

There are:

$C_n^0 = 1$ *n*-gram that have *n/n = 100%* percentage of <*G*> and *0/n = 0%* percentage of <*antiG*>*;*

$C_n^1 = n$ *n*-grams that have *(n-1)/n* percentage of <*G*> and *1/n* percentage of <*antiG*>*;*

$C_n^2 = n(n-1)/2$ *n*-grams that have *(n-2)/n* percentage of <*G*> and *2/n* percentage of <*antiG*>*;*

.

.

.

$C_n^k = \dfrac{n!}{k!(n-k)!}$ *n*-grams that have *(n-k)/n* percentage of <*G*> and *k/n* percentage of <*antiG*>*;*

.

.

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$C_n^n = 1$ *n*-gram that has *0/n = 0%* percentage of <*G*> and *n/n = 100%* percentage of <*antiG*>.

The total number of *n*-grams is:

$$\sum_{k=0}^{n} C_n^k = (1+1)^n = 1 + n + n(n-1)/2 + ... = 2^n .$$

7. Circular Representation of the n-grams

We represent the n-grams in the format of a circle, but such that each n-gram $<G_i>$ is diametrically opposed to its opposite n-gram $<antiG_i>$. We may start with any n-gram $<G_0>$ as the main one:

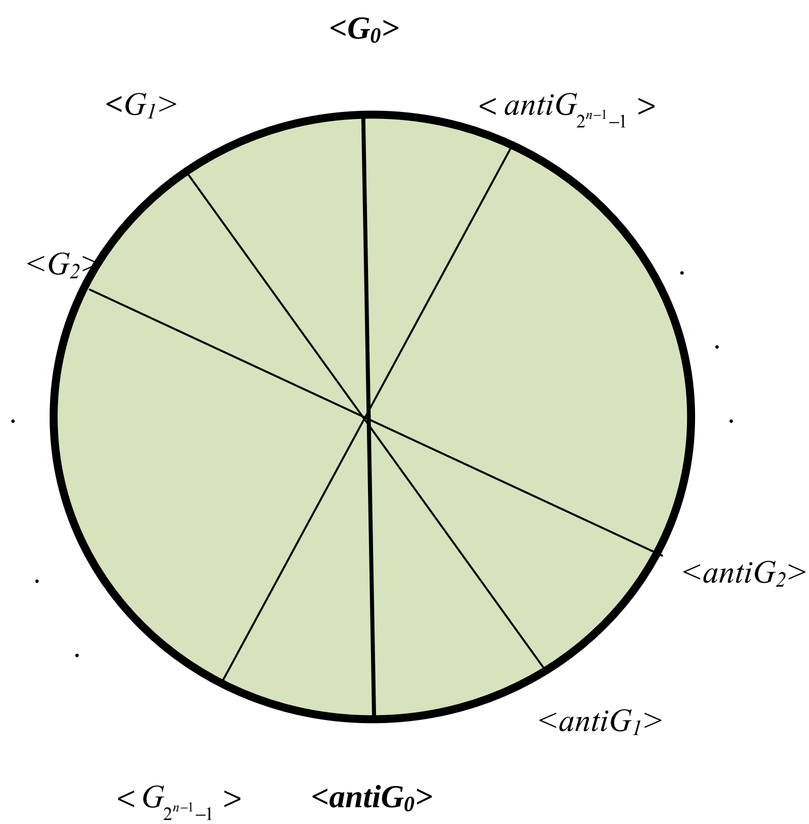

Figure 3

Conclusion

In this article the connection between *I Ching* (The Book of Change), Extenics, and neutrosophics has been made. Then a generalization from ancient trigrams and hexagrams to n-grams, $n \geq 1$, was presented at the end, together with the geometric interpretations of hexagrams and n-grams. An extension transformation is used to change from a hexagram to another one, and in general from an n-gram to another n-gram.

References

1. Wilhelm (trans.), Richard; Cary Baynes (trans.), "The I Ching or Book of Changes", from Internet.
2. *I Ching*, http://en.wikipedia.org/wiki/I_Ching
3. Cai Wen. Extension Set and Non-Compatible Problems [J]. Journal of Scientific Exploration, 1983, (1): 83-97.
4. Yang Chunyan, Cai Wen. Extension Engineering [M]. Beijing: Science Press, 2007.
5. F. Smarandache, Generalizations of the Distance and Dependent Function in Extenics to *2D, 3D*, and *n-D, viXra.org, http://vixra.org/abs/1206.0014 and http://vixra.org/pdf/1206.0014v1.pdf, 2012*.
6. F. Smarandache, V. Vlădăreanu, Applications of Extenics to 2D-Space and 3D-Space, viXra.org, http://vixra.org/abs/1206.0043 and http://vixra.org/pdf/1206.0043v2.pdf, 2012.

Extensica
în
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Semnificaţii

Extensica nu este altceva decît mult discutata interdisciplinaritate aplicată în practică care în realitate este studiu al simultaneităţii **entităţilor/univers.** Ea nu analizează doar două sau mai multe contrarii sau "rezolvarea problemelor contradictorii" ea studiază şi încearcă rezolvarae simultaneităţii **entităţilor/univers**. Mai exact ea nu studiază doar contrariile ca elemente bipolare ci relaţia dintre două **entităţi/univers** nu neapărat contrare. Doi oameni, două fapte, două situaţii sau două fenomene (două **entităţi/univers** diferite), dar şi continuitatea sau discontinuitatea acestora şi nu neapărat contrarii. Trebuie revenit asupra categoriei filozofice de contrarie, trebuie să extindem această categorie la întreaga **transformare/spaţiu/timp**. Dacă ţinem cont de formulele domnului Smarandache vom constata că între limitele sale orice **tranasformare/spaţiu/timp** este un raport de <A>/<antiA> unde de data aceasta prin <A> şi <antiA> nu mai definim contrariile ci limitele unei **transformări/spaţiu/timp**. Şi contrariile nu sînt altceva decît limitele transformării contrariei respective, respectiv ca exemplu trecerea de la pozitiv la negativ sau de la bine la rău. Şi trecerea de la o transformarea la alta este o contrarie sau dacă doriţi trecerea de la o contrarie la alta este o transformare a raportului <A>/<antiA> la fel cum se poate considera orice tranasformare în nelimitat. Tot ca exemplu putem defini contrarii şi transformarea noastră de la existenţă la inexistenţă sau de la viaţă la moarte sau trecerea de la o autostradă cu circulaţia pe dreapta la una cu circulaţia pe stînga, etc. În „supa" descoperită în final în Elveţia (care ar fi contrariile şi care <neutA>) ? toate

sînt unul şi acelaşi lucru ca şi într-o Gaură Neagră, sînt neconvenţionale. Deocamdată neconvenţionale pentru noi şi cunoaşterea noastră, pentru că nu putem încă să le definim **transformarea/spaţiu/timp** sau contrariile (cum doriţi), dacă reuşim convenţionalizarea lor ele devin convenţii pur şi simplu. Deoarece filozofii nu au înţeles corect legătura dintre **transformare/spaţiu/timp** şi contrarii ei au condiţionat **transformarea/spaţiu/timp** de contrarii. În realitate contrariile sînt însăşi **transformarea/spaţiu/timp** sau mai exact **transformarea/spaţiu/timp** are un caz particular contrariile. Aşadar contrariile sînt cazuri particulare ale **transformării/spaţiu/timp**. Neconvenţionalul merge dincolo de aceste convenţii ale **transformării/spaţiu/timp** şi de cunoaşterea noastră dincolo de „supa" amintită. Folosirea lui 0* şi ∞* ca şi al lui 0 şi ∞ ne aduce mai aproape de realitate dar nu la

Realitatea în Sine, doar ne măreşte limitele faţă de noi în nici un caz faţă de nelimitat.

Şi neutrosofia poate face acest lucru prin extensie. Din acest motiv trebuie să înţelegem fenomenul filozofic adică în ansamblul lui şi nu doar ştiinţific punctual, deoarece implicaţiile nu sînt doar de natura unei ştiinţe ci general valabilă adică filozofic ca simultaneitate a tuturor ştiinţelor. De la fizică cuantică la medicină, biologie, fizică, chimie, tehnologie de orice natură, chiar literatură sau artă, etc. indiferent dacă cineva consideră că rezolvarea sau nu a unei probleme contradictorii nu implică toate ştiinţele, mai mult sau mai puţim. Am să dau exemplul cu autostrăzile cu benzi diferite ce trebuiesc unite. Poate spune cineva că acest lucru nu are implicaţie, socială, artistică, fizică, biologică, tehnologică, chimică sau chiar medicală de ce nu spirituală, etc.? să nu vă grăbiţi, doar pentru faptul că nu înţelegem sau deocamdată nu vedem realitatea ci doar relativul ei nu putem nega lucrurile. Dacă ar schimba doar benzile de circulaţie este o soluţie, o soluţie convenţională sînt însă şi soluţii neconvenţionale şi nu mă refer la posibilitatea modulării maşinilor astfel ca volanul să acţioneze pe dreapta sau pe stînga în raport de necesităţi, eu privesc lucrurile mult mai neconvenţional. Dacă oamenii ar putea să moduleze totul la nivel molecular sau chiar atomic sau ar putea ajunge la teleportare nu ar mai avea nevoie să modueze şoselele şi nici oamenii. Poate că în viitor se poate modela omul şi nu autostrada printr-o simplă schimbare de ochelari sau cine ştie ce. Pentru că noi nu putem folosi realitatea în sine şi aici trebuie să respectăm regula şi să trucăm realitatea noastră pentru a păcăli Realitatea în Sine. Extensica este ca o trecere de la o filozofie teistă la una ateistă sau de la literatură la metematică sau în general de la o ştiinţă la alta. În natură şi în realitate această trecere este perfectă pentru că este neconvenţională şi se face la nivelul **entităţilor/univers** neconvenţionale simultan şi imperceptibil, nu există element neutru în simultaneitatea neconvenţională este ca naşterea sau moartea fiecăruia, noi nu ştim nici cînd ne naştem dar nici cînd murim aceasta este trecerea neconvenţională, o transformare ca trecerea de la copilărie la maturitate nu ştii niciodată cînd se face. În convenţional aşa cum spuneţi

şi dumneavoastră este ca în neutrosofie, trebuie să inventăm un <neutA> care ţine locul neconvenţionalului din noi sau din Universul în Sine, (chiar dacă acest <neutA> este doar unul relativ şi probabil) care face trecerea de la o contrarie la alta, în neconvenţional aceste contrarii nu mai există sînt perfect simultane încît noţiunea însăşi de contrarie devine absurdă. Autostrăzile cu siguranţă vor avea un <neutA> este un truc al realităţii noastre. Dacă am fi neconvenţionali maşina şi individul s-ar adapta din mers şi nu şi-ar da seama decît cînd sînt pe cealaltă autostradă sau mai exact nu şi-ar da seama niciodată pentru că neconvenţionalul nu poate reflecta convenţional. În Extensică este obligatorie neutrosofia şi <neutA>, dacă nu există <neutA> trebuie să-l inventăm (aşa cum am inventat cifra 0) ca pe un truc necesar al convenţionalului la fel cum trebuie să facem cu orice **entitate/univers**, aşa cum facem cu autostrăzile sau cum fac unii cu interdisciplinaritatea unde legăturile neconvenţionale ale simultaneităţii dintre fizică şi chimie (<neutA>) le spunem **chimie/fizică** chiar dacă niciodată nu vom putea defini limita exactă dintre ele. Analog **bio/chimie**, **bio/fizică**, etc. pentru oricare două ştiinţe veţi găsi <neutA> respectiv o ştiinţă de graniţă. Să nu credeţi că între literatură şi matematică nu este o ştiinţă de graniţă, ea există dar nu am denumit-o noi încă. Toate cele prezentate sînt <neutA> convenţional ales pentru neconvenţionalul simultaneităţii **entităţilor/univers** sau mai exact Extensica lor. Din păcate sau poate din fericire dacă nu şi una şi alta simultan (deoarece în lipsa echilibrului respectiv <neutA> am înebuni cu siguranţă datorită instabilităţii şi neputinţei, ca şi datorită lipsei celorlalte elemente oblgatorii ale unei **entităţi/univers**) acest <neutA> există pentru noi special, în realitate este **pozitiv/negativul** simultan al celor două extreme doar că dimensiunile simultaneităţii sale (ale lui <neutA>) sînt din ce în ce mai mici tinzînd către 0. Elementele sale de **formă/existenţă/spirit** sînt foarte puţin perceptibile (reflectabile, convenţionalizabile) pentru noi sau **entităţile/univers** care ne ajută. Acest <neutA> aparţine domeniului numerelor foarte mici iar ca să fie o trecere (transformare) imperceptibilă trebuie ca elementele sale să fie dacă este posibil 0. Adică 0*» 0. La fel trebuie să fie şi în ecuaţiile matematice dacă se poate să fie nu doar în limtele (0*,1) ci dincolo de 0* cît mai apropiat de 0, în lumea numerelor foarte mici dintre 0 şi 0*, în acelaşi timp în care <A> şi <antiA> să aparţină mulţimii (∞*,∞) adaptate cu un $\lambda(1)$ sau cu ∞* în raport de posibilităţile (trucurile) convenţiilor noastre.

Mai întîi să introducem cititorul în lumea noilor convenţii mai puţin convenţionale decît toate cele anterioare, (niciodată însă neconvenţionale în totalitate, neconvenţionale doar faţă de cunoaşterea noastră convenţională) astfel vom introduce o serie de noi semnificaţii (0, 0*, ∞*, ∞) chiar dacă poate simbolurile rămîn aceleaşi. Oamenii fac greşeala să încurce lucrurile, ei tind mereu să încurce realitatea lor (**iluzia/realitate**) cu Realitatea în Sine care nu le aparţine fiind reflectată de spiritul lor doar prin intermediari (simţuri, logică, instinct, etc.) niciodată direct. Din acest motive eu am

introdus elemente ajutătoare (trucuri, 0, 0*, ∞*, ∞) convenţionale ca să mă apropii de realitate.

Dacă discutăm filozofic, în Universul în Sine nu există cifra 1, există doar 0 şi cuantificările sau decuantificările acestuia. Cifra 0 în Universul în Sine ar trebui să fie inexistenţa dar ca pardox inexistenţa şi existenţa sînt simultane pentru Universul în Sine în toate formele lui convenţinale sau neconvenţionale. Doar noi **entităţile/univers** ni se pare că intuim existenţa şi inexistenţa separat şi le convenţionalizăm, separarea lor nu există ca realitate cum nu există nici cifra 0 sau1. Cifra 1 (este relativă) nu există nici în convenţional, doar multiplii sau submultiplii ei şi diviziunile (aceste cifre sînt limite neconvenţionale adică la nelimită) acesteia sau diverse cuantificări ale acesteia. 0 şi 1 sînt limitele Universului în Sine adică nelimitatul lui perfectul existenţei şi perfectul inexistenţei, paradoxal însă ele sînt simultane şi la limita lor dispar ca noţiuni convenţionale. Din acest motiv singurele limite pentru noi sînt cele convenţionale respectiv 0* şi ∞* (pe care le introduc eu) care în realitate nu sînt decît constante (infinit de mari sau de mici) limitate ale oricărei simultaneităţi **transformare/spaţiu/timp**. În acest caz orice **transformare/spaţiu/timp,** pentru noi, este convenţională, deci relativă, finită şi constantă raportată la Universul în Sine. Mai mult dincolo de 0* şi ∞* există limitele 0 şi ∞ unde (0*,∞*) ∈(0, ∞). Asta înseamnă simultaneitatea celor două domenii de definiţie în nici un caz identitatea lor. Cum orice **transformarae/spaţiu/timp** are un domeniu de definiţie (0*, ∞*) acest lucru implică simultaneitatea oricărei **transformări/spaţiu/timp** convenţionale cu cea neconvenţională, dar şi cu cele intermediare (0n*, ∞n*). Acestă explicaţie ne arată că orice univers, orice **entitate/univers** şi ca entitate şi ca univers sînt simultane cu alte **entităţi/univers** (legea simultaneităţii). Atîta timp cît există un ∞* care respectă relaţia 0*∞*=c există şi un 0 care împreună cu nelimitatul (un 0 nelimitat de mic, deoarece şi 0* este ∞* de mic ca să respecte relaţia 0*∞*=c) respectă relaţia 0∞= c diferenţa este că în timp ce în convenţional „c” poate lua valori în intervalul (0,1) dacă 0* şi ∞* sînt simetrice (respective 0*=1/∞*), în cazul 0∞=c nu există valori în afara intervalului (0,1) pentru “c”, singura lui valoare este 1, este unică la fel ca şi 0 sau ∞.

Trebuie ţinut cont permanent că între 0* şi 1, ca şi între 1 şi ∞* sînt ∞* subdiviziuni convenţionale iar în cazul nelimitatului, nelimitate subdiviziuni ca în realitate. De asemenea între 0* şi 0 sînt nelimitate subdiviziuni ca şi între ∞* şi ∞. Acest lucru se datorează însă nu infinitului nostru convenţional (∞*) sau lui 0* ci nelimitatului

∞. Se pot lua nelimitate perechi de 0^*şi ∞^* respectiv (0_1^*, ∞_1^*), (0_2^*, ∞_2^*), (0_3^*, ∞_3^*)....

(0, ∞), etc. şi fiecare are ∞^* variante la stînga şi la dreapta lui 1 în raport de domeniul de

definiţie al lui ∞^* (N, R, Q, C, etc.) şi domeniile nou definite iau aceste valori. Adică între 0^* şi 1 sînt numere raţionale, complexe, etc. şi între 1 şi ∞^*sînt tot valori pe aceleaşi domenii de definiţie dar şi între 0_1^* şi 1, sau 1 şi ∞_1^*, sau între 0^*şi 0_1^*sau ∞_1^* şi ∞^* ş.a.m.d. pînă la 0 şi ∞. Limita acestui şir este nelimitatul lor iar ca produs este 1, toate

sînt simetrice faţă de 1. . Singura lor diferenţă este gradul de multiplicare sau demultiplicare care se reduce la adunare şi înmulţire cu şi faţă de 1 şi 0. Astfel orice număr dincolo de ∞^* este un număr cuantificat prin adunare sau scădere de 1, respectiv $\infty_1^*=\infty^*+ \lambda(1)$ (indiferent de modelul funcţiei acestuia) unde λ reprezintă cuantificarea lui 1 prin adunare sau scădere de orice natură. Să nu uităm că înmulţirea sau orice operaţie este cuantificare prin adunare sau scădere de 1 şi subdiviziunile acestuia. Calculatorul şi sistemul binar al acestuia este exemplu edificator care rezolvă orice ecuaţie (fenomen, materie sau energie, etc.) prin multiplicare sau demultiplicare a lui 1 şi 0. Dacă sîntem în lumea numerelor naturale atunci $\infty_1^*=\infty^*+1$, ş.a.m.d. automat se poate calcula simetricul lui ∞_1^* sau valorile intermediare exterioare acestuia faţă de 0^*. În acest fel constatăm că orice mulţime de valori ale produsului lor din domeniul (0_1^*, ∞_1^*) este valabilă şi pentru domeniul (0_1^*, ∞_1^*) dar şi pentru domeniile (0_1^*, 0^*) sau (∞^*,∞_1^*), diferenţa dintre ele este ordinul de cuantificare, între ∞_1^* şi ∞^* dat de $\lambda(1)$. Unde λ poate lua toate valorile lui ∞^*. Putem spune astfel că orice valoare a lui ∞_1^* este o valoare a lui λ cuantificată cu ∞^*. Caz particular $\infty_1^*=\infty^*+R$ (mulţimea numerelor reale), pentru orice număr r există un $0_1^*(R)$. Pentru orice număr al lui R, 0_1^* are un corespondent ∞_1^* prin cuantuificarea cu ∞^*şi evident simetric al lui $0_1^*(R)$.

Ţinînd cont de ceea ce am adus în prim plan pînă acum nu putem nega realitatea realţiei $0^*\infty^*=c$ dar nici pe cea a lui 0 unde $0\infty=1$ cu atît mai mult că nu putem nega

existenţa nelimitatului cum nu putem nega existenţa unui 0 ca nelimitat de mic. 0 şi ∞

fiind limitele nelimitate ale lui 0^* şi ∞^*. Să nu uităm un aspect important, să nu facem greşeala să credem că realţiile $0=c/\infty$, sau $0=1/\infty$ sînt relaţii neconvenţionale ele rămîn

convenţionale sau mai exact neconvenţionale pentru cunoaşterea actuală dar nu neconvenţionale adică nelimitate. În nelimitat aceste convenţii devin absurde deoarece relaţia $0\infty=1$ dispare ca noţiuni sau sensuri iar la nelimitat 0 şi 1 devin absurde. Să nu

uităm de asemenea că orice relaţie, funcţie, formulă, etc. matematică sau de altă natură este o cuantificare sau decuantificare a lui 1 şi 0 ca dovadă că orice operaţie este prelucrată de un calculator oricît de sofisticată ar fi iar calculatorul nu ştie decît 0 şi 1.

Ba mai mult o să constatăm că şi sentimente sau energii sînt cuantificări de 0 şi 1 şi că acestă cunoaştere este energie care produce legături sau desface lgături ceea ce este echivalent lui 0 şi 1. Fenomenul este la fel şi în creierul oricărei fiinţe raţionale sau mai puţin raţionale, doar că are alte energii şi alte sisteme de numeraţie, de legături. În convenţional 0* sau ∞* sînt de fapt o cuantificare sau decuantificare de 1, în timp ce în neconvenţional cuantificarea este pentru 0 ceea ce ne spune că universul neconvenţional este doar o multiplicare de 0 adică cuantificare de secveţe neconvenţionale 0 în nelimitat. Diferenţa între om sau orice alte **entităţi/univers** şi Universul în Sine este datorată energiei care produce procesarea datelor adică a vitezei în **spaţiu/timp** în care se produce procesarea şi modul procesării respectiv **transformarea/spţiu/timp** care produce acestă procesare. În spatele lor este doar energie în forme şi legături diferite. După toată acestă teorie cred că putem spune că în lume numerelor foarte mici sau foarte mari putem lua un ∞* (oricît de mare, dar niciodată nu va fi nelimitat) astfel încît dincolo de mulţime numerelor (0*,∞*) să putem calcula un $\infty_1^* = \infty^* + \lambda(1)$, astfel încît să putem calcula un $0_1^* = 1/(\infty^* + \lambda(1))$ respectîndu-se relaţia $0_1^* \infty_1^* = 1$. Este o evidenţă că Universul în Sine ca şi 0 sau nelimitatul sînt unice chiar dacă nu vom cunoaşte niciodată limitele lui în ambele sensuri.Vrem nu vrem **entităţile/univers** sîntem şi noi şi toate sînt valori intermediare ale domeniului (0, ∞) unde produsul lor este 1. 0 şi ∞ sînt tot constante dar paradoxal constante nelimitate (în timp ce ∞* este un infinit limitat şi constantă, ∞ este o constantă nelimitată) ceea ce în convenţional nu se poate convenţionaliza, în plus acestea (0 şi ∞) nu mai pot fi cuantificate dincolo de ele deşi avem tendinţa să credem acest lucru. Acestă relaţie lim 0*∞* =1 cînd 0* »o şi ∞*»∞ este o axiomă care nu trebuie să necesite demonstraţie şi nici nu are demonstraţie. Trebuie să ţiem cont doar că acestă limită devine 0∞=1 sau 0=1/∞ relaţie valabilă în convenţional.

O să spună unii că nu este obligatoriu 1 ci poate fi orice valoare c. Fals pentru că dacă în loc de 1 punem o altă valore 0,1 spre exemplu acest lucru se traduce prin mărirea nelimitatului (reducere la absurd) ©, adică relaţia ar fi 0=1/10∞ ceea ce presupune mărirea nelimitatului, (0 ar trebui să devină şi mai mic) în acest punct relaţia este absurdă pentru că nici 0 şi nici ∞ nu mai sînt cuantificabile. Această relaţie este un adevăr recunoscut dar nedemonstrabil şi este relaţia generalizată între limitele oricărei **entităţi/univers** adică **transformare/spaţiu/timp** şi **formă/existenţă/spirit**. Un caz particular sîntem şi noi oamenii pentru om 0* este naşterea lui în timp ce ∞* al lui este moartea lui şi asemănător pentru fiecare parametru al său. Produsul lor este c ∈(0,1) pentru perioda existenţei sale (perioada convenţională) şi 1 pentru limita existenţei sale

cînd el devine **entitate/univers** constantă, finită şi invariabilă în nelimitat. În acel moment toate variabilele lui devin constante mai mari sau mai mici dar invariabile definitiv. Omul devine atunci o unitate (**entitate/univers**) trecută. Pentru orice **entitate/univers** produsul 0*∞*=c în timpul existenţei dar la limita existenţei sale devine 1. Aşa cum am arătat în timpul existenţei valorile pot depăşi domeniul (0,1) pentru valori nesimetrice, în afara limitelor 0* şi ∞* şi nu în interiorul lor.

La fel ar fi şi cu Universul în Sine dacă ar apare şi dispare dar el nu are această posibilitate convenţională el este neconvenţional şi 0 şi 1 sînt simultane, noi doar convenţional avem produsul limitelor sale 1, la limita lui toate elementele sale devin constante şi invariabile şi nu ar mai putea reveni la o nouă **entitate/univers** fiind nelimitat. (ar însemna să devină limitat) Relaţia 0∞=1 nu ar mai fi valabilă şi s-ar transforma în 0*∞*=c ceea ce ar contrazice realitatea deoarece dincolo de 0 şi ∞ nu mai există, în realitate 0 şi ∞ nu există pentru noi sau orice **entitate/univers** sînt doar o extrapolare, ele sînt ceva ce noi nu vom putea defini niciodată. 0 şi ∞ reprezintă unicitatea, perfecţiunea universului în sine, nelimitatul lui, iar produsul lor **existenţa/inexistenţa** sa. 0 este o constantă nelimitat de mică, invarabilă, ∞ este constantă nelimitat de mare invariabilă. Şi 0* şi ∞*sînt constante nelimitat de mici sau de mari pentru noi convenţiile cît existăm dar după finalul existenţei noastre adică în neconvenţional ele devin clar finite. Cît existăm datorită variabilităţii noastre ni se pare că ele sînt variabile, în realitate noi nu le cunoaştem doar cei care ne urmeză constată invariablitatea lor după moartea noastră.

Legea acumulării şi divizării sau legea A*+D*

Plecînd de la definiţie Extensica {=rezolvarea problemelor contradictorii in orice domenii (rezolvarea problemelor inconsistente (contradictorii)} să ne oprim la soluțiile contradictorii din matematică. Toate cazurile de nedeterminare din matematică au corespondenţe în orice ştiinţă sau neştiinţă ca şi teoria lui 0* şi ∞*. Grăbirea convenţională (accelerarea convenţională) se produce nu doar în matematică, fizică, chimie sau alte ştiinţe ci şi în neştiinţe ca şi în natura cosmică. Exemplu formarea Big-Bang nu este altceva decît acumulări succesive de planete sau alte sisteme solare sau de altă natură. Apoi acest Big-bang de la acumulare a trecvut la divizare (expansiune) a **materiei/energie** neconvenţionale şi nu doar în forma neconvenţională ci şi în formă convenţională. De fapt Big-bangul era deja o **materie/energie** convenţională dar nu pentru capacitatea nostră de cunoaştere actuală. Această **materie/energie** deja

convenţională a accelerat procesul convenţional formînd energii convenţionale (multiplicări ale acumulărilor succesive cum sînt înmulţirea şi împărţirea faţă de adunare sau altele) depăşind limitele gravitaţiei neconvenţionale şi creează planete, vegetaţie, apă, viaţă, etc. într-un ritm mult mai mare decît acumularea gravitaţională. La fel şi omul cu energiile sale convenţionale accelerează fenomenele în mod convenţional specific **entităţii/univers** om şi elementelor sale **formă/existenţă/spirit** ca şi elementelor acestora în raport de capacităţile lui convenţionale sau de necesităţile lui convenţionale. Reamintesc că orice număr este repezentat de cifra unu şi multiplii şi submultiplii acesteia în convenţional şi de cifra 0 în neconvenţional şi că orice valoare a unei funcţii indiferent de domeniul de definiţie este un multiplu sau submultiplu al lui 1. Calculatorul este unul din cele mai sigure argumente deocamdată, el lucrînd doar cu 0

şi 1 în timp ce Universul în Sine doar cu 0 plecînd de la relaţia $0\infty=1$, adică 1 este un multiplu nelimitat al lui 0 în neconvenţional. Relaţie valabilă şi în convenţional dacă folosim relaţia $0^*\infty^*=1$. Şi acest 1 este multiplu infinit de 0*, mai mult trebuie să ţinem cont că orice număr în orice sistem de numeraţie foloseşte aceleaşi simboluri (respectiv cifre) şi ca atare mutiplii şi submultiplii ai lui 1. Pînă şi cele 10 cifre de la 1 la 10 sînt multiplii sau submultiplii ai lui 1 iar în matematica convenţională nu există alte cifre. Am definit în acest fel o nouă lege T*, legea acumulării şi divizării Universului în Sine, adică legea A*+D* care se defineşte astfel:

- orice **entitate/univers** este acumlare sau divizare a lui 1 în convenţional sau de 0 dacă vorbim de neconvenţional.

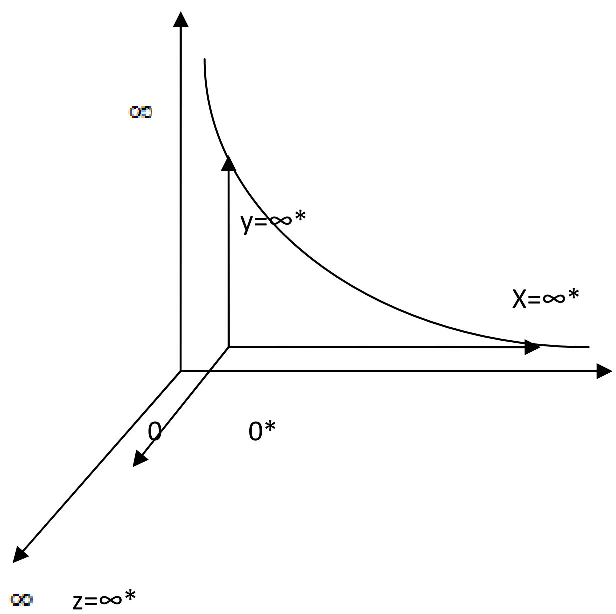
Această lege are şi formularea matematică prin relaţia $0\infty=1$, relaţie care se traduce prin faptul că un număr nelimitat de 0 (este vorba de un 0 neconvenţional, nelimitat de mic, secvenţa neconvenţională 0) de **entităţi/univers, entităţi/univers** 0 nelimitat de mici dau o unitate (o **entitate/univers** unitate 1). }n particular rela’ia devine convenţională şi se scrie $0^*\infty^*= 1$, care ne spune acelaşi lucru dar foloseşte valori convenţionale.

Cazuri particulare din matematică şi neconvenţionalul lor

Să analizăm cîteva cazuri de nedeterminare din matematică, $\infty-\infty=$ nedeterminat, $\infty/\infty=$ nedeterminat, sau $0/0$ = nedeterminat, $0\infty=$ nedeterminat, $0^0=$ nedeterminat, $\infty^0=$ nedeterminat şi 1^n ($n=\infty$). Trebuie să aducem în discuţie la aceste cazuri toate cazurile asimptotice ale funcţiilor care sînt de aceiaşi natură cu aceste cazuri nedeterminate. Dacă vom considera infinitul asimptotic (şi nu ∞, nelimitatul) un ∞* atunci vom şti toate valorile funcţiei inclusiv pentru ∞*. Desigur că există şi valori dincolo de ∞* dar acestea

ori nu ne interesează ori devin imposibil de determinat, ori dacă este nevoie extrapolăm valoarea lui ∞^* cu un λ(1. Cazul parabolelor este evident în acest sens dar nu trebuie să ne oprim doar la parabolele matematice sau fizice sau chimice relaţia cu 0^* şi ∞^* este valabilă oricărei parabole literare, sensibile, logice sau ilogice, ştiinţifice sau neştiinţifice. Ca principiu general ar trebui modificat sistemul de cordonate în raport de 0, 0^*, ∞^* şi

∞, astfel graficele ar putea fi în felul următor,



Unde $0^*\infty^*=1$, iar $0\infty=1$.

- $\infty-\infty$= nedeterminat, este o variantă neclară pentru că noi sîntem limitaţi şi din acest motiv ∞ nu este nelimitat ci limitat, chiar dacă noi în intuiţia noastră intuim

nelimitatul lui. De aceea revenim la semnificaţiile introduse respectiv 0, 0^*, ∞^*, ∞, care definesc mult mai exact realitatea (chiar dacă nu Realitatea în Sine) şi totodată extindem infinitul nostru limitat la nelimitat. În acest caz dacă înlocuim ∞ cu ∞^* rezultă relaţia $\infty_1^*-\infty^*= 0^*$ unde eroarea este dată de mărimea lui ∞^* şi numai dacă cele două valori ∞_1^* şi ∞^* sînt diferite, evident $\infty_1^*-\infty^*=0^*$, unde toate cele trei valori sînt numere concrete convenţionale iar relaţia este o realitate a noastră o realitate convenţională. Fiind în convenţional putem alege orice valoare pentru ∞_1^*şi∞^* iar diferenţa lor verifică relaţia

prezentată. Dacă ∞_1^*şi∞^* tind către ∞ este evident că diferenţa lor tinde către 0 neconvenţional, nelimitat de mic şi nici în acest caz nu putem verifica nedeterminarea lui.

- ∞/∞, aşa cum am arătat mai sus trebuie să facem diferenţierea între posibilităţile noastre convenţionale şi neconvenţional prin introducerea noilor convenţii. În acest caz relaţia poate fi scrisă $\infty_1^*/\infty^*=1+a$,unde a $\in(0,1)$ dacă $\infty_1^*>\infty^*$sau

$\infty_1^*/\infty^*=1-a$ unde a $\in(0,1)$ dacă $\infty_1^*<\infty^*$. În cazul în care ∞_1^*şi ∞^*»∞ relaţia devine $\infty/\infty=1$ dar totodată devine şi imposibilă deoarece convenţional dispare totul ca sens, chiar şi sensurile.

- 0/0, este analog lui ∞/∞ doar că reaţia devine $0_1^*/0^*=1+a$ unde a $\in(0,1)$ dacă $0_1^*>0^*$ sau $0_1^*/0^*=1-a$ dacă $0_1^*< 0^*$. În realitate oamenii nu caută neapărat aceste valori convenţionale ei caută nelimitatul pe care oricum nu îl vor găsi şi chiar dacă prin absurd l-ar găsi acesta este dispărut în acelaşi moment.
- 0^0, se transformă în $0^{*0*}=a$ iar în acest caz devine o valoare determinată.
- ∞^0, devine $\infty^{*0*}=a$, de asemenea valori determinate şi nu nedeterminate pe toată perioada existenţei.

- 1^n, unde $n=\infty$. Caz nedeterminat oare de ce? Dacă $n=\infty^*$ atunci valoarea $1^n= 1$ pentru orice n. Dacă mergem la limita lui 1^n către nelimitat doar la limită aceasta nu este 1 dar acolo nu mai este nimic sau este totul simultan pînă la desfiinţarea

convenţiilor de orice natură inclusiv 1 şi ∞.

- 0∞, în realitate relaţia convenţională 0∞=nedeterminat nu este valabilă, sau este doar convenţional valabilă dacă dorim să impunem acest lucru, deoarece raprtul lor nu este o variabilă ci o constantă. În realitate $0\infty=c$ unde c are valori în orice sistem de numeraţie şi respectă relaţia $c/\infty =0$. Este greu să cred că nedeterminat/∞=0 mai ales

dacă nedeterminatul este ∞ sau 0 sau nelimitat, sau orice valoare între ∞ şi ∞, adică dincolo de infinit în nelimitat. Îl vom analiza un pic mai special plecînd de la relaţia

$0^*\infty^*= 1$, care este o relaţie perfect valabilă atîta timp cît $0^* \neq 0$ şi $\infty^*\neq \infty \neq \infty$ iar 0^* şi ∞^* sînt simetrice faţă de 1, în aceste condiţii există o funcţie $f(x,y) = 1$, unde $x=0^*$, iar $y=\infty^*$

care să verifice relaţia. Evident în aceste condiţii $\infty^*/\infty = 0$, dar şi $c/\infty=0$, unde ∞ =

nelimitat. În acest fel definim un 0^* şi ∞^* care pot fi cuantificate cu orice $\lambda \neq 0$ şi $\lambda \neq \infty$, care poate aparţine, sau nu, intervalului $(0^*, \infty^*)$. Relaţia $0^*\infty^*= 1$ este un caz particular al relaţiei $0^*\infty^*= c$ pentru că în matematică $0^*\infty^*=c$ sau $0^*\infty^*=$ nedeterminat dar acest nedeterminat este nedeterminat ca valori ale lui c şi nu că c ar fi mai puţin constantă.Ţinem cont în acest sens şi de relaţia $0^*=c/\infty^*$, adică $0^*\infty^* = c$, întrucît $\infty^*\neq 0$, relaţie recunoscută de matematica noastră convenţională. Este de asemenea evident că $0^*\in(0,1)$. În acest fel printr-un coeficient λ putem merge în lumea numerelor foarte mici, sau foarte mari. În orice structură, formulă, **entitate/univers**, convenţie, trebuie introdus un coeficient care face parte din universul numerelor foarte mici sau foarte mari care să corecteze relaţia convenţională şi care să reprezinte relativul oricărei relaţii, legi, etc. Trebuie să plecăm de la faptul că orice număr convenţional este fomat din cifra unu prin multiplicare sau demultiplicare adică prin adunare şi scădere şi nimic altceva. Singura diferenţă este că această multiplicare (adunare şi scădere) se poate grăbi (convenţional) prin artificii de înmulţire şi împărţire sau alte operaţii şi funcţii, dar toate absolut toate pleacă de la ceea ce v-am prezentat. În neconvenţional toate cifrele şi relaţiile îndiferent de ştiinţă pleacă de la cifra 0. Adică cifra 1 este o sumă nelimitată de cifre 0 ($0\infty=1$ este adevărată) sau în convenţional este o multiplicare a lui 0^* cu ∞^*, respectiv $0^*\infty^*= 1$. Orice sistem de numeraţie pleacă de la acest număr şi putem scrie fără dubii că mulţimea numerelor naturale N este de fapt $N= 1+N^*$ sau $N=1+ \infty^*$ unde $\infty^*\in N^*$ ($N^* =N-1$). În acest fel se poate scrie că orice sistem de numeraţie dincolo de ∞^* pleacă de la ∞^* la care se adaugă un număr nelimitat de alte diviziuni evident dintr-un sistem de numeraţie sau altul. 0^* şi ∞^* teoretic nu mai sînt nedeterminate dacă le-am considerat diferite de 0 sau de ∞, ele au o valoare bine determinată dar nu le ştim valoarea şi pot lua o mulţime de valori ceea ce în convenţional este mai greu. Să presupunem că $0^*= 1/a$ unde $a \neq (0,1)$, în acest caz există un număr $\infty^*=a$ astfel ca $0^*\infty^*= 1$. Dacă luăm un şir de valori ale lui 0^* şi ∞^*, respectiv $0n^*$ şi ∞n^*, obţinem un şir de limite $(0n^*,\infty n^*)$ cu relaţia dintre ele $0n^*= 1/(\infty^*+n)$ şi $\infty n^*=\infty^*+n$ (n poate fi natural, real, raţional, etc.) asta implică faptul că pentru orice $0n^*$există un ∞^*+n ca relaţia să rămînă valabilă. Asta presupune că pentru intervalul $0n^*$ şi ∞n^*există limitele 0,1 al produsul lor, limite între care putem lua orice valoare pentru $0n^*$ şi ∞n^*.Trebuie să remarcăm faptul că atît $0n^*$ cît şi ∞n^* nu sînt valori variabile ci constante chiar dacă ele sînt infinite către mărime nelimitată sau către un 0 nelimitat de mic. Aceste valori sînt limitele finite ale unei **entităţi/univers** (om, calculator, telescop, planetă, etc.) Filozofic vorbind produsul existenţial de la naşterea unei **entităţi/univers** (0^*) pe toate direcţiile cu limita infinitului său (∞^*) este 1 în realitatea convenţională dar şi la limita lor neconvenţională în condiţiile enunţate mai sus. Doar pentru Universul în Sine valoarea produsului 0©=1

în orice condiţii, în timp ce pentru orice valoare mai mică de ∞ produsul este între (0,1)

indiferent cît de mari sau de mici sînt valorile 0 şi ∞. În Universul în Sine produsul 0*∞*= 1 este cuprins între (0 ,1). De aici pînă la matematica neconvenţională mai avem un pas, vorbind de neconvenţionalul cunoaşterii noastre şi nu de neconvenţionalul în sine. Putem scrie realaţia 0*∞*= c unde c ≠ (0,1) doar dacă în realitate putem presupune un ∞* nesimetric faţă de 1, în acest caz valoarea produsului este mai mare sau mai mică decît 0 sau 1. Dacă ∞n*≠∞* acesta poate fi ∞n*=∞*+a sau ∞*=∞n* -a, pentru orice a ∈C. În acest caz 0*∞*=1 devine 0*(∞n*-a) = 1, adică 0*∞n*=1+a0*.(toate operaţiile sînt valabile pentru că toate numerele sînt diferite de 0). După această explicaţie putem spune că între simetricele 0* şi ∞*produsul lor este între 0 şi 1. Adică c ∈(0,1) pentru 0* ∈(0,1) în timp ce dacă 0n*=0*+a, atunci din relaţia 0n*∞*= c rezultă a=(c-1)/ ∞* mai mic decît 1. Între 0 şi 1 sînt nelimitate subdiviziuni dar şi în afara lor întrucît nu putem lucra cu nelimitatul ne vom opri întotdeauna la un limitat 0*şi ∞* care sînt valori cuantificabile care se pot extinde dincolo de numerele mari sau mici actuale. Relaţiile rămîn valabile ca extrapolare şi în neconvenţional dar este doar o ipoteză niciodată verficabilă pentru că nelimiattul nu ne aparţine. Pardoxal însă în nelimitat existenţa şi inexistenţa nu pot fi depăşite iar ele reprezintă 0 şi 1 neconvenţional, nelimitate, adică dincolo de orice 0*şi

∞* există un singur Univers în Sine. Relaţia 0∞ nu este niciodată 0 şi nici valori între 0 şi

1 pînă la limita nelimitatului ∞ şi al lui 0, care de fapt ca un paradox nu există (devin absurde ca noţiuni convenţionale). La valori nesimetrice intermediare limitelor lor (deoarece produsul lor nu permite existenţa nesimetrică a unuia dintre ele în afara lor) produsul lor nu poate fi decît 1 pentru orice valoare conform demonstraţiei anterioare. Dovada este însăşi existenţa **entităţilor/univers** şi nelimitatul lor ca număr, formă etc.

cu probabilitate de apariţie 1/ ∞ şi posibilă doar datorită relaţiei 0∞=1. Este însă inutil să vorbim convenţional de neconvenţional motiv pentru care ne oprim la relaţia 0*∞*= 1 şi la convenţiile noastre. Preluînd aceste lucruri filozofic vom constata că orice realitate convenţională respectă acestă regulă şi să urmărim sentimentele care deşi au valori de la 0* la ∞* ele sînt un singur sentiment sau orice univers este o singură entitate simultan. Sentimentele, existenţa, forma, etc. sînt acest nedeterminat c cu valori între 0*şi ∞* dar în acelaşi timp nu depăşesc valoarea 1 în condiţii de simetrie ci doar anomalia lor face valori dincolo de 0 şi 1. Noi sîntem valorile nedetermnate ale Universului în Sine la fel cum pentru noi sentimentele noastre sînt aceste valori nedeterminate. Toate aceste

valorii convenţionale sînt constante şi limitate (bine determinate ca **transformare/spaţiu/timp** şi **formă/existenţă/spirit** faţă de Universul în Sine) chiar dacă

noi nu sesizăm acest lucru. $0\infty=$nedeterminat mi se pare improprie pentru că în Universul în Sine nimic nu este nedeterminat faţă de Universul în Sine **entităţile/univers** sînt nedeterminate pentru noi sau alte **entităţiunivers** dar nu pentru Universul în Sine. Este greu de acceptat şi pentru că este mai greu de acceptat relaţia

nedeterminat/ $\infty=0$ mai ales cînd nu ştii valoarea nedeterminatului care poate fi însăşi ∞ şi în acest caz cu siguranţă nu mai respectă relaţia convenţională. Dacă însă nedeterminatul este o valoare constantă inclusiv ∞^* atunci relaţia devine logică în convenţional. Chiar şi în cazul $c/\infty^*=0^*$ pentru că este o convenţie iar relaţia este logică în convenţional. Unii poate vor pune la îndoială logica ei dar atît timp cît 0^* şi ∞^*sînt valori simetrice relaţia este valabilă indiferent cît de mari sau de mici sînt aceste valori. A nu se confunda valoarea c cu viteza luminii. Aceste valori aparent sînt variabile dar variabilul lor este de fapt datorat nouă care sîntem variabili şi nu acestor valori constante ca şi în cazul mişcării cînd ne mişcăm noi avem senzaţia că se mişcă obiectele care stau pe loc, (în relativitatea absolută chiar nu se ştie cine stă şi cine se mişcă) noi şi convenţiile noastre sîntem relativi şi nu Universul în Sine neconvenţional şi nelimitat şi invariabil, adică perfect. Noi sîntem imperfecţiunea perfecţiunii fără de care nici perfecţiunea nu ar exista dar nici invers. În concluzie raportul c/©=0 nu este real pentru

noi ci corect este $1/\infty=0$, dar nici $\infty^*/\infty=0$ sau $c/\infty^*=0$ nu sînt corecte, ele ne arată totodată

un singur lucru că produsul $0^*\infty^*$sau 0∞ nu este nedeterminat ci o valoare constantă

nedeterminată adică $0^*\infty^*=c$ sau $0\infty=1$. Această constantă reprzintă **entităţile/univers** din Universul în Sine şi valori între 0 şi 1 sau raportate într-un fel sau altul la 0 şi 1 cu

probabilitatea logică de $1/\infty^*=0^*\neq 0$ sau $1/\infty=0$.

Lumea realităţii noastre convenţionale (iluzierealitate) este aceasta, adică cea cuprinsă între 0^* şi ∞^*, aceasta este de fapt realitatea cunoaşterii noastre şi a existenţei noastre spirituale indiferent ce credem sau ce spunem noi sau alte **entităţi/univers**. Din întîmplare acestă realitate este simultană cu o Realiatate în Sine dar şi cu o realitate în care există 0 ca şi nelimitatul, adică şi ceea ce există dincolo de 0^* şi ∞^* şi ambele suprapuse (simultane) cu o lume nelimitată în care toate convenţiile noastre sau ale

oricărei **entităţi/univers** chiar dacă există nu mai pot fi reflectate convenţional de nici o

entitate/univers deorece 0 şi ∞ devin unul şi acelaşi lucru simultan asemănător cifrei 0 care este şi pozitivă şi negativă în acelaşi timp în care nu este nici pozitivă nici negativă, nemaiputînd face o astfel de interprtare. Aceste relaţii interpretate filozofic ne spun ceea ce ne spune şi realitatea, că dincolo de limitele noastre adică între 0* şi 0 sau între ∞* şi nelimitat sînt alte limite 0n* şi ∞n*cu nelimitate subdviziuni şi variante şi **entităţi/univers** dar diferite în acelaşi **timp/spaţiu** (cuantificate în plus sau minus, **pozitiv/negativ**) şi tot aşa merg în nelimitat indiferent cît de mare sau de mic este infinitul nostru convenţional.(∞*)

O funcţie **entitate/univers**

Să ne imaginăm o funcţie pentru orice **entitate/univers**, este clar că nu putem să producem o funcţie care să înlocuie perfect o **entitatea/univers** şi că trebuie să ne folosim de trucurile convenţionale ca în cinematografie (cele 24 de imagini) sau în matematică multiplicarea rapidă sau demultiplicarea rapidă (respectiv înmulţirea şi împărţirea sau alte funcţii), în pictură perspectiva, în literatură imaginile fowlkneriene dar care sînt o mulţime şi în fizică, chimie, etc. În cinematografie ştim că mişcarea să redă prin succesiunea rapidă a 24 sau mai multe imagini, în pictură perspectiva este dată prin linii carea pleacă dintr-un punct iar paralelismul prin linii care se intersectează dincolo de peisaj, în matematică orice operaţie în afară de adunare este un truc, o cuantificare rapidă cum spun eu în încercarea de a scurta timpul sau spaţiul sau transformarea, în fizcă se fac modele mecanice, electrice sau de altă natură pentru studiul fenomenelor în timp şi spaţiu chiar dacă ştim că nu sînt realitatea în sine. Şi în cazul nostru trebuie să găsim un truc filozofic (un model de funcţie) dar să şi ţinem cont că singura legătură dintre transformările a două **entităţi/univers** este cuantificarea sau decuantificarea adică în convenţional adunarea sau scăderea în variantele lor convenţionale diverse. În acest fel orice relaţie matematică sau fizică sau de altă natură nu trece una la alta decît prin cuantificae sau decuantificare. Dar să trecem la funcţia noastră unde cea mai complexă legătură şi care doar aparent redă simutaneitatea (ca şi adunarea şi scăderea care aparent dau simultaneitate) este funcţia funcţiei adică F[fn(x)]

unde n»∞ iar x »∞.Plecînd de la această variantă să ne imagină o **entitate/univers** ca o combinaţie de două funcţii E[fn(x,y,z)]U[fn(α,β,γ)] unde U este universul iar E este entitatea iar x=forma, y=existenţa, z=spiritul, α=transformare, β=spaţiu, γ=timp . La rîndul lor fiecare din aceste variabile sînt funcţii compuse de alte variabile respectiv x=f (a_1, b_1, c_1, .. etc.) unde a,b,c, .. etc.= parametrii formei, y= f (a_2, b_2, c_2, .. etc.) unde a_2, b_2, c_2, .. etc.= parametrii existenţei (gol, plin) iar y= f (a_3, b_3, c_3, .. etc.) unde a_3, b_3, c_3, .. etc.=

parametrii spiritului (memorie, gîndire, intuiţie, instinct, etc.). Toate acste funcţii şi parametrii merg în nelimitat în funcţie de alţi parametrii şi alte funcţii dar noi fiind în convenţional ne putem opri la o convenţie acceptată la care vom adăuga o funcţie de corecţie f (λ) iar λ= λ(1) care să reprezinte corecţia şi evident aprţinînd lumii numerelor foarte mici, adică relativul **entităţii/univers** datorat parametrilor necunoscuţi interiori sau exteriori şi acestă funcţie nu trebuie să lipsească de la nici o **entitate/univers**. Acestă funcţie rămîne o convenţie, limitată şi relativă pe care în raport de convenţiiile noastre o putem neglija sau nu. Plecînd de aici şi încadrînd orice **entitate/univers** în limitele ei de existenţă adică 0* şi ∞* pentru orice parametru, ţinînd cont că valorile simetrice în intervalul 0* şi ∞* pot fi stabilite avem o imagine truc a unei **entităţi/univers**. Această funcţie adaptată pentru fiecare **entitate/univers** în parte o putem utiliza pentru rezovarea contradicţiilor ei sau cel puţin pentru depistarea punctelor sensibile în raport de fiecare parametru **pozitiv/negativ**. Lumea acestor parmetri este cea prezentată în schema neconvenţională a parametrilor unei **entităţi/univers**. Cu o astfel de funcţie putem determina elementele ei neutre în raport de **spaţiu/timp** sau de elementele lor de comparaţie limitate în raport de relativul acestei funcţii f (λ). Realitatea ne spune de la început că această funcţie trebuie să fie o simultaneitate **finit/infinită** de funcţii limtate şi relative în timp ce funcţia f (λ) deşi limitată la lumea numerelor foarte mici ea este nelimiată ca diviziuni.

Lumea reală în raport de <A> şi <antiA>.

Realitatea noastră dar şi realitatea în sine sînt o simultaneitate de <A> şi <antiA> iar <neutA> nu există decît convenţional, teoretic <neutA> este tot o simultaneitate de <A> şi <antiA>, un S[(<A>/<antiA>)] unde <A> şi <antiA> au valori **pozitiv/negative** în permanenţă, convenţional spus. În neconvenţional <neutA> nu există dar ca orice paradox totul este un <neutA> ca o simultaneitate de <A> şi <antiA>. Adică să nu ne facem nici o iluzie că dacă raportul <A>/<antiA> =0,99 cele două sînt separate sau că una din ele nu există, atîta timp cît există un raport există simultaneitatea lor. <neutA> nu există dar aparţine oricărei valori ale raportului <A>/<antiA>, adică filozofic convenţional şi neconvenţional <neutA> nu există dar face parte din orice raport <A>/<antiA> al oricărei **entităţi/univers** inclusiv formule matematice, fizice, chimice, etc. ca şi în neutrosofie simultaneitatea lui <A> şi <antiA>. Orice fenomen convenţie are o reprezentare matematică, fizică, chimică, etc. adică o filozofie matematică, chimică, etc. ca şi o filozofie generală **entitate/univers** ca dovadă că în principiu pe calculator se poate studia orice fenomen sau transformare, mai bine sau mai puţin bine în raport de capacitatea convenţiilor noastre. Aceste reprezentări sînt funcţii de <A> şi <antiA> , necunoscutele lor sînt şi ele simultaneităţi de <A> şi <antiA> (ca orice **entitate/univers**). <A> şi <antiA> au acelaşi domeniu de definiţie, deoarece A ∊(0*,∞*) iar 0*∞*=1 dar şi <antiA>∊(0*,∞*), ţinînd cont că în afara lui <A> nu există <antiA> în acest caz rezultă

acelaşi domeniu de definiţie iar $0*\infty*=1$. A crede că există un <antiA> în afara domeniului de definiţie al lui <A>, este ca şi cînd am spune că poate exista lumină fără întuneric sau **entităţi/univers** fără materie sau fără energie sau pozitivul fără negativ, sau o singură latură a oricărei contrarii, etc. în acest caz <neutA> este un element de simetrie în raportul dintre <A> şi <antiA> cum este 1 pentru produsul limtelor lor ceea ce putem spune că 1 este simetricul lui <A> şi <antiA> respectiv <neutA>=1. Doar 1 este neutru şi faţă de <A> şi faţă de <antiA> în raportul dintre ele adică <A> / <antiA> =1=<neutA>. Depinde de noi unde situăm această valoare a lui 1 pe axa dintre ele. Nu putem spune că valarea raportului este 0 sau poate fi zero niciodată deoarece valoarea fiecăreia este diferită de 0 ca să existe, chiar dacă şi 0 poate fi un neutru pentru **pozitiv/negativ** de exemplu dar nu ca produs ci ca adunere ceea ce noi nu comentăm momentan. Este evident că pentru orice valoare $c \in (0*, \infty*)$ produsul $0*c=a<1$. Încă un argument că limita intervalului adică $\infty*$ verifică relaţia $0*\infty*=1$. Pentru a demonstra că $a<1$ este suficient să luăm un $0*<\infty n*<\infty*$ pentru care relaţia nostră devine $0*\infty n*=a$, dar $\infty n*=\infty*-k$, unde $0*<k<\infty*$ ceea ce duce la $0*(\infty*-k)=a$ de unde rezultă $1-k0*=a$ ceea ce evident ne confirmă ipoteza deoareace şi $0*$ şi k sînt numere diferite de 0, dacă ar fi 0 $a=0$ adică $\infty n*=\infty*$. În raport de acest element de echilibru fiecare valoare are un simetric în intervalele respective, nu numai atît toate elementele unei **entităţi/univers** respectă această regulă a simetriei limitelor sale. În mod convenţional putem alege alte valori pentru simetrie dar toate sînt doar cuantificări ale lui 1 şi al simetricelor acestuia. În matematică acest <neutA> există ca şi în alte ştiinţe sau neştiinţe dar nu există ca realitate neconvenţională.

Noi şi limitele noastre convenţionale

Poate unii o să ne spună că viaţa unui om plecă de la 0 şi se termină ca exemplu la 50 de ani şi că produsul limitelor sale este ori 0 ori nedeterminat ori 50, în nici un caz 1. Cu părere de rău le spunem că pe de o parte niciodată omului nu-i putem determina cu precizie de 100% anul naşterii sau al morţii (nu există sistem de măsurare perfect) iar pe de altă parte condiţia de bază este ca cele două valori să fie simetrice şi să acceptăm o anumită eroare convenţională (eroare care ne redă relativul convenţiei). Simetricul lui 50 este 1/50, adică 0,02. Eroarea find de (0-0,02)/50 =0,0004 faţă de 0. În plus ca realitate naşterea (ca şi mortea) nu există, este o transformare continuă. Valorile sînt realative ca orice valoare convenţională. Din cauza acestor motive putem convenţional alege oricînd un $0*$ în raport de $\infty*$ (50 de ani) astfel ca relaţia să fie valabilă în raport de eroarea pe care o dorim sau o acceptăm. În condiţiile noastre relative $0*\in(-1,0)$ sau $0*\in(0,1)$ iar $50=\infty*\in(49,50)$ sau (50,51). Trebuie însă luat în calcul că vorbim de valori convenţionale mici sau mari dar nu de valori convenţionale foarte mici sau foate mari care se pot obţine prin multiplicarea domeniului$(0*,\infty*)$ cu orice $\lambda(1)$. În cazul numerelor foarte mici sau foarte mari echivalenţa se menţine dar eroarea se micşorează. În cazul numerelor

mici sau mari vorbim de numere dar la numere foarte mici sau foarte mari vorbim doar de simboluri ale numerelor. Orice **entitate/univers** nu poate să-şi cunoască simetria deorece nu-şi atinge limitele şi ca atare nu poate face produsul lor, valabil şi pentru Universul în Sine. Ţinînd cont că orice convenţie, **entitate/univers** este definită de domeniu de definiţie, limite, elemente de echilibru şi de comparaţie fiecare din aceste elemente are propria-i determinare şi ca atare propriile limite la care produsul lor simetric este 1. Limitele oricărui parametru sînt definite de $0^* \in (0, 1)$ şi $\infty^* \in (1, \infty)$ sau mai exact intervalului $\infty^* \in (\infty^*-1, \infty^*)$ sau (∞^*, ∞^*+1), adică respectă regula neutrosofică a lui Smarandache respectiv $\infty^* \in (\infty^*-\varepsilon, \infty^*+\varepsilon)$ iar $0^* \in (0, 1)$, 0 şi 1 echivalentele lui $0^*+\varepsilon$ şi $0^*-\varepsilon$. Trebuie supus unei analize această relaţie deorece folosim un ε dar în realitate relaţia este $\infty^* \in (\infty^*-\varepsilon_1, \infty^*+\varepsilon_2)$ şi doar în cazuri particulare $\varepsilon_1=\varepsilon_2$. În realitate niciodată nu este valabilă relaţia $\varepsilon_1=\varepsilon_2$ pentru că atunci ar putea fi determinat orice număr în mod perfect şi nu relativ ştiind că este media domeniului său.

Energie neconvenţională

Singura energie nelimitată este gravitaţia de fapt nu gravitaţia ci o forţă de atracţie care se transformă convenţional în gravitaţie. Dovada celor spuse de mine ste însăşi acea supă descoperită în Elveţia unde sînt convins că deşi nu mai putem separa convenţional energia de materie este şi energie şi materie iar materia este sub atracţia unor energii necunoscute încă. Această atracţie este echivalentul acumulării universale în timp şi spaţiu şi vinovatul existenţei oricărei transformări în Universul în Sine. Trebuie să ţinem cont şi de contrariul ei respectiv respingerea sau echivalentul descompunerii al împingerii materiei în afara ei echivalent al convenţionalei pierderi sau scăderi din matematică. În termeni astronomici contracţia universului şi expansiunea lui. Orice **entitate/univers** este efect al acestei acumulări şi energiei ei neconvenţionale sau în termeni convenţionali simultaneitate **materie/gravitaţie**. Nimic nu s-a format în univers fără gravitaţie chiar şi energiile convenţionale respectiv electrică, magnetică, atomică, etc. dacă ne gîndim că mai întîi trebuiau să se acumuleze particulele neconvenţionale la care nu se mai poate vorbi de energiile noastre convenţionale şi nu doar atît nu putem vorbi de energie atomică dacă atomii nu există ca şi de un cîmp magnetic dacă aceşti atomi nu mai există ca în „supa" domnilor din Elveţia. **Entităţile/univers** neconvenţionale gravitează în Universul în Sine în formă convenţională şi neconvenţională în mod liber, acumularea lor este în timp şi spaţiu nelimitat iar după o acumulare suficientă această simulatneitate produce materii şi energii convenţionale. În final aceste **entităţi/univers** de **materie/energie** (convenţionale) prin acumulări succesive (convenţionale sau neconvenţionale) sau diviziuni ajung din nou **entităţi/univers** neconvenţionale în stadiu liber nelimitat de mici sau de mari. Trebuie să ne punem întrebări neconvenţionale şi să ne depăşim propriile limite să nu credem că energiile sînt finite, să nu credem că ceeea ce cunoaştem

este Realitatea în Sine să nu credem că Big-Bangul este ultima frontieră, limita, cînd de fapt pînă acum nu am găsit limită nici măcar în interiorul atomului. Orice formă de organizare nu s-a format din inexistenţă, nici măcar din vid, ci pe o acumulare neconvenţională **materie/energie** care este în acelaşi timp **materie/energie** convenţională şi neconvenţională. O **materie/gravitaţie** dincolo de capacitatea noastră de convenţionalizare. Crede cineva că planetele sau Big-Bangul sau Găurile Negre sînt posibile fără garvitaţie? Se înşeală. Crede cineva că ar fi apărut viaţă sau forme de organizare fără gravitaţie (indiferent cît de mare sau de mică)? Se înşeală. Crede cineva că ar fi existat existenţă fără acumulare? Se înşeală. Nimic nu se putea forma în lipsa unor acumulări succesive datorită unei atracţii (gravitaţii) la fel cum totul dispare, se transformă datorită acestei energii inepuizabile, nelimitate (singura energie real neconvenţională). Nu ne referim la gravitaţia unei planete sau alta care este o gravitaţie convenţională, ne referim la o gravitaţie neconvenţioanlă care îşi permite să atragă elemente (secvenţe) neconvenţionale “0” în **materie/energie** neconvenţională şi convenţională, acolo unde materia şi energia (gravitaţia) se confundă pînă la dispariţia posibilităţii de convenţionalizare. Ideea de a face structuri modulare nu este o noutate, dar idea de a face structuri modulare din elemente neconvenţionale este categoric nouă dar şi imposibilă pînă la proba contrarie; (depinde pînă unde convenţionalizăm noi neconvenţionalul). Teoretic putem spune că este posibil în cazul nostru să modulăm atomii şi moleculele şi nu oamenii sau şoselele, dar nu eu sînt cel care poate face sau nu acest lucru fiecare ştiinţă are această sarcină în raport de direcţia în care merge, poate nu merge dar idea de modulare neconvenţională (poate acum doar SF) va aduce mai devreme sau mai tîrziu soluţii şi modele noi neconvenţionale. Dacă nu în construcţii poate în transportarea în spaţiu şi timp a noastră sau pe alte planete. Poate şi în matematică redefinim modulul în raport de elementele neconvenţionale sau nedeterminate. Acumularea şi divizarea sînt singurele operaţii neconvenţionale (nelimitate, unice, etc.) respectiv adunarea şi scăderea în convenţional. Demonstarţia este banală dacă ţinem cont că un calculator face şi desface orice fenomen, funcţie, sistem, etc. doar prin adunare şi scădere şi doar cu 0 şi 1. Savanţii ca şi artiştii sau orice geniu au căutat cifra perfectă, această cifră este 1 pentru convenţional şi 0 pentru neconvenţional. Dacă vom ajunge la limita neconvenţională cînd vom putea aduna şi scădea doar cifre de 0 şi să obţinem aceleaşi rezultate convenţionale, atunci vom fi noi Dumnezeu şi nu vom avea limite. Ar rămîne totuşi o singură diferenţă între conenţional şi neconvenţional din acest punct de vedere, spaţiul şi timpul acestor acumulări sau divizări. Convenţionalul le face în **spţiu/timp** limitat, în timp ce neconenţionalul în **spaţiu/timp** nelimitat.

Concluzii

Trebuie să ţinem cont că 0 şi ∞ sînt valori constante, nelimitate, indiferent cît de mari sau de mici iar produsul lor nu poate fi decît o cifră constantă intermediară lor, regulă de altfel respectată şi în convenţional. Dacă însă în convenţional produsul limitelor poate lua orice valoare între limitele respective, în neconvenţional adică nelimitat nu poate lua orice valoare ci doar una singură, general valabilă, component

tuturor celorlalte valori. Nu putem concepe că 0 şi ∞ sînt unice dar produsul lor dă valori multiple, absurd. Aceasă cifră a produsului nu poate să întrunească toate aceste condiţii decît dacă cifra este 1. Un 1 care poate reprezenta şi Universul în Sine dar şi orice **entitate/univers** prin multiplii şi submultipli lui. Pentru a studia diverse cazuri trebuie să stabilim elementele lui neutre, domeniile sale de definiţie, limitele ca şi unităţile sale de comparaţie. Orice **entitate/univers** are aceste elemente şi orice parametru al ei de asemenea are aceste elemente. Matematicienii trebuie să găsească funcţii pentru diverse **entităţi/univers,** să le adapteze la realitate să le asocieze un relativ apoi pe tot parcursul cunoaşterii să completeze şi să corecteze transformarea funcţiei pînă la perfecţiunea la care nu vom ajunge niciodată dar ghidează convenţiile realităţii noastre relative; (funcţia realativităţii f (λ) este permanentă chiar şi la valorile concrete şi constante ale **entităţii/univers**). Orice funcţie în cazul general, orice **entitate/univers** convenţională pleacă de la elementele caracteristice, de aceea şi funcţiei noastre trebuie să îi atribuim aceste elemente ca ea să devină o convenţie (chiar dacă relativă) cu care să putem opera. La fel la orice **entitate/univers** (om, maşină, şosea, pom, energie, materie, etc.).

Bibliografie:

Florentin Smarandache & Tudor Păroiu, *Neutrosofia ca reflectarea a realităţii neconvenţionale*, Ed. Sitech, Craiova, Romania, 130 p., 2012.

ADENDUM

Semnificaţii neconvenţionale şi convenţionale

Pentru o bună sistematizare şi înţelegere să definim cîteva convenţii în noul sistem :

- ∞^* reprezintă infinitul limitat convenţional
- ∞ îl redefinim ca infinitul nelimitat
- 0^* îl definim ca zero convenţional limitat de mic
- 0 îl definim ca zero nelimitat de mic
- e_j este secvenţa convenţională a entităţii în neconvenţional
- u_j este secvenţa convenţională a universului în neconvenţional

- 1_0 este unitatea neconvenţională **transformarespaţiutimp** unde $1_0 = \sum_0^{\infty} 0$,

- $1^* = 1$ este unitatea convenţională în neconvenţional, $1^* = \sum_1^{\infty^*} 0^*$

- E/U = $\sum_1^{\infty^*} e_j|_{1^*} / \sum_0^{\infty} u_j|_{0\,0}$ formula **entităţii/univers** generalizată şi neconvenţională, valabilă perfect şi la entităţile de forma <A>, <neutA>, şi <antiA> din neutrosofie.

Extension Communication for Solving the Ontological Contradiction between Communication and Information

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The study lies in the interdisciplinary area between the information theory and extenics, as the science of solving the contradictions. This space addresses the central issue of the ontology information, the contradictory relationship between communication and information. The research core is the reality that the scientific research of communication-information relationship has reached a dead end. The bivalent relationship communication-information, information-communication has come to be contradictory, and the two concepts to block each other. With the Extenics as a science of solving the conflicting issues, "extenics procedures" will be used to solve the contradiction. In this respect, considering that the matter-elements are defined, their properties will be explored ("The key to solve contradictory problems, Wen Cai argues, the founder of Extenics (1999, p 1540), is the study of properties about matter-elements"). According to „The basic method of Extenics is called extension methodology" (...), and "the application of the extension methodology in every field is the extension engineering methods" (Weihai Li, Chunyan Yang, 2008, p 34).

With linguistic, systemic, and hermeneutical methods, grafted on "extension methodology" a) are "open up the things", b) is marked "divergent nature of matter-element", c) "extensibility of matter-element" takes place and c) "extension communication" allows a new inclusion perspective to open, a sequential ranging of things to emphasize at a higher level and the contradictory elements to be solved. "Extension" is, as postulated by Wen Cai (1999, p 1538) "opening up carried out".

After the critical examination of conflicting positions expressed by many experts in the field, the extenics and inclusive hypothesis is issued that information is a form of communication. The object of communication is the sending of a message. The message may consist of thoughts, ideas, opinions, feelings, beliefs, facts, information, intelligence or other significational elements. When the message content is primarily informational, communication will become information or intelligence.

The arguments of supporting the hypothesis are linguistic (the most important being that there is "communication of information" but not "information of communication"), systemic-procedural (in the communication system is developing an information system; the informing actant is a type of communicator, the information process is a communication process), practical arguments (the delimitation eliminates the efforts of disparate and inconsistent understanding of the two concepts), epistemological arguments (the possibility of inter-subjective thinking of reality is created), linguistic arguments (it is clarified and reinforced the over situated referent, that of the communication as a process), logical and realistic arguments (it is noted the situation that allows to think coherently in a system of concepts - derivative series or integrative groups) and arguments from historical experience (the concept of communication has temporal priority, it appears 13 times with Julius Caesar). The main arguments are summarized in four axioms: three are based on the pertinent observations of Tom D. Wilson-Marcus Solomon, Magoroh Maruyama and Richard Varey, and the fourth is a relevant application of Florentin Smarandache's neutrosophic theory on communication.

Keywords: extension communication, information, extenics, ontology, neutrosophic communication, message

I. The information thesis as a form of communication

The question of the relationship between communication and information as fields of existence is the fingerprint axis of communication and information ontology. The ontological format allows two formulas: the existence in the act and the virtual existence. The ontological component of the concepts integrates a presence or a potency and an existential fact or at a potential of existence.

In addition to the categorial-ontological element, in the nuclear ratio of communication-information concepts it shows comparative specificities and regarding attributes and characteristics, on three components, epistemological, methodological and hermeneutical.

In a science which would have firmly taken a strong subject, a methodology and a specific set of concepts, this ontological founding decision would be taken in an axiom. It is known that, in principle, axioms solve within the limits of that type of argument called evidence (clear and distinct situation), the relations between the systemic, structural, basic concepts. Specifically, in Extenics, scientists with an advanced vision, substantiated by professor Wen Cai, axioms govern the relationship between two matter-elements with divergent profiles. For the communication and information issues that have occurred relatively recently (about three quarters of a century) in subjects of study or areas of scientific concern not a scientific authority to settle the issue

was found. The weaknesses of these sciences of soft type are visible even today when after non accredited proposals of science ("comunicology" - communicology Joseph De Vito, "communicatics," - "comunicatique" of Metayer G., informatology - Klaus Otten and Anthony Debon) it was resorted to the remaining in the ambiguity of validating the subject "The sciences of communication and information" or "The sciences of information and communication", enjoying the support of some courses, books, studies and dictionaries.

This generic vision of unity and cohesion wrongs both the communication and information. In practice, the apparent unjust overall, integrative, altogether treatment has not an entirely and covering confirmation. In almost all humanist universities of the world the faculties and the communication courses are prevailing, including those of Romania and China. Professor Nicolae Drăgulănescu ascertained in what Romania is concerned, that in 20 colleges communication (with various denominations) is taught and in only two the informing-information is taught.

The main perspectives from which the contradictory relationship of communication-information was approached are the ontological, the epistemological and the systemic. In most cases, opinions were incidental. When it was about the dedicated studies, the most common comparative approach was not programmatically made on one or more criteria and neither directly and applied. Jorge Reina Schement, R. Brent Ruben, Harmut B. Mokri and Magoroh Maruyama's contributions remain fundamental.

In his study "Communication and Information" (19 March 9, pp. 3-31), J. R. Schement starts from the observation that "in the rhetoric of the Information Age, the communication and information converge in synonymous meanings." On the other hand, he retains that there are specialists who declare in favor of stating a firming distinction of their meanings. To clarify exactly the relationship between the two phenomena, i.e. concepts, he examines the definitions of information and communication that have marked the evolution of the "information studies" and the "communication studies". For informing (information) three fundamental themes result: information-as-thing (M. K. Buckland), information-as-process (N.J. Belkin, R.M. Hays, Machlup & Mansfield, etc.), Information-as-product-of - manipulation (C.J. Fox, R.M. Hayes). It is also noted that these three subjects involve the assessing of their issuers, a "connection to the phenomenon of communication". In parallel, from examining the definitions of communication it is revealed that the specialists "implicitly or explicitly introduce the notion of information in defining communication". There are also three the central themes of defining communication: communication-as-transmission (W. Weaver, E. Emery, C. Cherry, B. Berelson, G. Steiner), communication-as-sharing-process (RS Gover, W. Schramm), communication-as-interaction (G. Gerbner, L. Thayer). Comparing the six thematic nodes, Schement emphasizes that the link between

information and communication is "highly complex" and dynamic "information and communication is ever present and connected" (Schement JR, 1993, p 17). In addition, in order that “information exist, the potential for communication must be present”.

The result at the ontological level of these findings is that the existence of information is (strictly) conditioned by the presence of communication. That is for the information to occur communication must be present. Communication will precede and always condition the existence of information. And more detailed: communication is part of the information ontology. Ontologically, information occurs in communication also as potency of communication. J. R. Schement is focused on finding a way to census a coherent image leading to a theory of communication and information ("Toward a Theory of Communication and Information" - Schement JR, 1993, p 6). Therefore, he avoids to conclusively asserting the temporal and linguistic priority, the ontological precedence and the amplitude of communication in relation to information. The study concludes that 1. "Information and communication are social structures" ("two words are used as interchangeable, even as synonyms" – it is argued) (Schement JR, 1993, p 17), 2. "The study of information and communication share concepts in common" (in both of them communication, information, "symbol, cognition, content, structure, process, interaction, technology and system are to be found" - Schement JR, 1993, p 18), 3. "Information and communication form dual aspects of a broader phenomenon" (Schement J.R., 1993, p. 18). In other words, we understand that: a) linguistically ("words", "terms", "notions", "concepts", "idea of") communication and information are synonyms; b) as area of study the two resort the same conceptual arsenal. Situation produced by these two elements of the conclusion allows, in our opinion, a hierarchy between communication and information. If it is true that ontologically and temporally the communication precedes information, if this latter phenomenon is an extension smaller than the first, if eventual sciences having communication as object, respectively information, benefit from the one and the same conceptual vocabulary, then the information can be a form of communication. Despite this line followed coherently by the linguistic, categorical-ontological, conceptual and definitional epistemological arguments brought in the reasoning, the third part of the conclusion postulates the existence of a unique phenomenon which would include communication and information (3. "Information and communication form two aspects of the same phenomenon "- Schement JR, 1993, p 18). This phenomenon is not named. The conclusive line followed by the arguments and the previous conclusive elements enabled us to articulate information as one of the forms of communication. Confirmatively, the fact that JR Schement does not name a phenomenon situated over communication and information, gives us the possibility of attracting the argument in order to strengthen our thesis that information is a form of communication. That is because a category of

phenomena encompassing communication and information cannot be found. J. R. Schement tends towards a leveling perspective and of convergence in the communication and information ontology. Instead, M. Norton supports an emphasized differentiation between communication and information. He belongs to those who see communication as one of the processes and one of the methods "for making information available". The two phenomena "are intricately connected and have some aspects that seem similar, but they are not the same" (M. Norton, 2000, p 48 and 39). Harmut B. Mokros and Brent R. Ruben (1991) lay the foundation of a systemic vision and leveling understanding of the communication-information relationship. Taking into account the context of reporting as a core element of the internal structure of communication and information systems, they mark the information as a criterion for the radiography of relationship. The systemic-theoretical non-linear method of research founded in 1983 by B. R. Ruben is applied to the subject represented by the phenomena of communication and information. Research lays in the "Information Age" and creates an informational reporting image. The main merit of the investigation comes from the relevance given to the non-subordination between communication and information in terms of a unipolar communication that relates to leveling information. Interesting is the approach of information in three constituent aspects: "informatione" (potential information - that which exists in a particular context, but never received a significance in the system), "information" (active information in the system) and "information" (information created socially and culturally in the system). The leveling information is related to a unified communication. On each level of information there is communication. Information and communication is co-present: communication is inherent to information. Information has inherent properties of communication. Research brings a systemic-contextual elucidation to the relationship between communication and information and only subsidiarily a firm ontological positioning. In any case: in information communication never misses.

In the most important studies of the professor Stan Petrescu: "Information, the fourth weapon" (1999) and "About intelligence. Espionage-Counterespionage"(2007), information is understood as "a type of communication" (Petrescu S., 1999, p 143) and situated in the broader context of "knowledge on the internal and international information environment "(S. Petrescu, 2007, p 32).

II. The subject of communication: the message. The subject of informing: the information. The information thesis as species of message

In order to finish our basic thesis that of the information as a form of communication, new arguments may be revealed which corroborate with those previously mentioned. As phenomena, processes, the communication and

information occur in a unique communication system. In communication, information has acquired a specialized profile. In the information field, the intelligence, in his turn, strengthened a specific, detectable, identifiable and discriminative profile. It is therefore acceptable under the pressure of practical argument that one may speak of a general communication system which in relation to the message sent and configured in the communication process could be imagined as information system or intelligence system. Under the influence of the systemic assumption that a (unitary) communicator transmits or customize transactionally with another (receiving) communicator a message, one may understand the communicational system as the interactional unit of the factors that exerts and fulfill the function of communicating a message.

In his books "Messages: building interpersonal communication skills" (attained in 1993 its fourth edition and in 2010 its twelfth) and "Human Communication" (2000), Joseph De Vito (the renowned specialist who has proposed the name "Communicology" for the sciences of communication - 1978), develops a concept of a simple and productive message. The message is, as content, what is communicated. As a systemic factor, it is emerging as what is communicated. To remember in this context is that the German Otto Kade insisted that what it is communicated to receive the title of "release". According to Joseph De Vito, through communication meanings are transmitted. "The communicated message" is only a part of the meanings (De Vito J., 1993, p 116). Among the shared meanings feelings and perceptions are found (De Vito J., 1993, p. 298). Likewise, information can be communicated (De Vito J., 1990, p 42), (De Vito J., 2000, p 347).

In a "message theory" called "Angelitică" (Angelitics), Rafael Capurro argues that the message and information are concepts that designate similar but not identical phenomena. In Greek "Angela" meant message; from here, "Angelitica" or theory of the message (Angelitica is different from Angeologia dealing, in the field of religion and theology, with the study of angels) (http://www.capurro.de/angelitics.html). R. Capurro set four criteria for assessing the relationship between message and information. The similarity of the two extends over three of them. The message, as well as the information, is characterized as follows: „is supposed to bring something new and/or relevant to the receiver; can be coded and transmitted through different media or messengers; is an utterance that gives rise to the receiver's selection through a release mechanism of interpretation". "The difference between these two is the next: „a message is sender-dependent, i.e. it is based on a heteronomic or asymmetric structure. This is not the case of information: we receive a message but we ask for information" (http://www.capurro.de/angeletics_zkm.html). To request information is to send a message of requesting information. Therefore, the message is similar to the information in this respect too. In our opinion, the difference between them is from genus to species: information is a species of message. The message depends on the transmitter and the information, as well.

Information is still a specification of the message, is an informative message. C. Shannon asserts that the message is the defining subject of the communication. He is the stake of the communication because „the fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point” (1949, p. 31).

The communication process is in fact the "communication" of a complex and multilayered message. 'Thoughts, interests, talents, experiences"(Duck S., Mc Mahan D.T., 2011, p 222), "information, ideas, beliefs, feelings "(Wood J.T., 2009, p 19 and p 260) can be found in a message. G. A. Miller, T. M. Newcomb and Brent R. Ruben consider that the subject of communication is information: "Communication - Miller shows – means that information is passed from one place to another” (Miller G. A., 1951, p. 6). In his turn, T. M. Newcomb asserts: „very communication act is viewed as a transmission of information” (Newcomb T. M., 1966, p. 66) and Brent R. Ruben argues: „Human communication is the process through which individuals in relationships, groups, organizations and societies create, transmit and use information to relate to the environment and one another” (Ruben B. R., 1992, p. 18).

Professor Nicolae Drăgulănescu, member of the American Society of Information Science and Technology, is the most important of Romanian specialists in the Science of information. According to him, "communicating information" is the third of the four processes that form the "informational cycle", along with generating the information, processing/storing the information and the use of information. The process of communication, N. Dragulanescu argues, is one of the processes whose object is the information (http://ndragulanescu.ro/publicatii/CP54.pdf, p 8). The same line is followed by Gabriel Zamfir too; he sees the information as "what is communicated in one or other of the available languages" (Zamfir G., 1998, p. 7), as well as teacher Sultana Craia: communication is a "process of transmitting a piece of information, a message" (Crai S., 2008, p 53). In general, it is accepted that information means transmitting/receiving information. However, when speaking of transmitting information, the process is considered not to be information but communication. Therefore, it is created the appearance that the information is the product and communication would only be the transmitting process. Teodoru Ştefan, Ion Ivan şi Cristian Popa assert: "Communication is the process of transmitting information, so the ratio of the two categories is from the basic product to its transmission" (Stephen T., Ivan I., Popa C., 2008, p 22). The professors Vasile Tran and Irina Stănciugelu see communication as an "exchange of information with symbolic content" (V. Tran, Stănciugelu I., 2003, p 109). The communication is an over-ranged concept and an ontological category more extended than informing or information. On the other hand, information is generated even in the global communication process. From this point of view, information (whose subject-message is information) is a regional,

sectorial communication. Information is that communication whose message consists of new, relevant, pertinent and useful significances, i.e. of information. This position is shared by Doru Enache too (2010, p 26).

The position set by Norbert Wiener, consolidated by L. Brillouin and endorsed by many others makes from the information the only content of the message. N. Wiener argues that the message "contains information" (Wiener N., 1965, p 16), L. Brillouin talks about "information contained in the message" (L. Brillouin, 2004, p 94 and p 28).

Through communication "information, concepts, emotions, beliefs are conveyed" and communication "means (and subsumes) information" (Rotaru N., 2007, p.10). Well-known teachers Marius Petrescu and Neculae Năbârjoiu consider that the distinction between communication and information must be achieved depending on the message. A communication with an informational message becomes information. As a form of communication, information is characterized by an informative message and a "message is informative as long as it contains something unknown yet" (M. Petrescu, Năbârjoiu N., 2006, p 25). One of the possible significant elements that could form the message content is thus the information as well. Other components could be thoughts, ideas, beliefs, knowledge, feelings, emotions, experiences, news facts. Communication is "communicating" a message regardless of its significant content.

III. Four axioms of communication-information ontology

3.1. The message axiom. We call the ontological segregation axiom on the subject or the Tom D. Wilson-Solomon Marcus' axiom, the thesis that not any communication is information, but any information is communication. Whenever the message contains information, the communicational process will acquire an informational profile. Moreover, the communicational system becomes informational system. Derivatively, the communicator becomes the "informer" and the communicational relationship turns into informational relationship. The interactional basis of society, even in the Information Age, is the communicational interaction. Most social interactions are non-informational. In this respect, T. D. Wilson has noted: „We frequently receive communications of facts, data, news, or whatever which leave us more confused than ever. Under formal definition these communications contain no information" (Wilson T. D., 1987, p. 410). Academician Solomon Marcus takes into account the undeniable existence of a communication "without a transfer of information" (Marcus S., 2011, vol. 1. P. 220). For communications that do not contain information we do not have a separate and specific term. Communications containing information or just information are called informing.

Communication involves a kind of information, but as Jean Baudrillard

stated (Apud Dancu VS, 1999, p 39), "it is not necessarily based on information". More specifically, any communication contains cognition that can be knowledge, data or information. Therefore, in communication, information may be missing, may be adjacent, incidental or collateral. Communication can be informational in nature or its destination. That communication which by its nature and organization is communication of information is called informing.

The main process ran in Information System is informing. The function of such a system is to inform. The actants can be informants, producers-consumers of information, transmitters of information, etc. The information action takes identity by the cover enabled onto-categorial by the verb "to inform". In his turn, Petros A. Gelepithis considers the two concepts, communication and information to be crucial for "the study of information system" (Gelepithis PA, 1999, p 69).

Confirming the information axiom as post reductionist message, as reduced object of communication, Soren Brier substantiates: „communication system actually does not exchange information" (Brier S., 1999, p. 96). Sometimes, within the communication system information is no longer exchanged. However, communication remains; communication system preserves its validity, which indicates and, subsequently, proves that there can be communication that does not involve information.

Then:

a) when in the Information System functional principles such as "need to know"/"need to share" are introduced,

b) when running processes for collecting, analyzing and disseminating information,

c) when the beneficiaries are deciders, "decision maker", "ministry", "government", "policymakers" and

d) when the caginess item occurs,

this Information System will become Intelligence System (see Gill P., MarrinS., Phytian M., 2009, p. 16, p. 17, p. 112, p. 217), (Sims J.E., Gerber B., 2005, p. 46, p. 234; Gill P., Phytian S., 2006, p. 9, p. 236, p. 88; Johnson L.K. (ed.) 2010, p. 5, p. 6, p. 61, p. 392, p. 279, Maior G.-C. (ed.), 2010). "Secrecy, Peter Gill establishes, is the Key to Understanding the essence of intelligence" (Gill P., S. Marrin, Phyti of n M., 2009, p 18), and professor George Cristian Maior emphasizes: "in intelligence, collecting and processing information from secret sources remain essential" Major G.-C., 2010, p 11).

Sherman Kent, W. Laqueur, M.M. Lowenthal, G.-C. Major etc. start from a complex and multilayered concept of intelligence, understood as meaning

knowledge, activity, organization, product, process and information. Subsequently, the question of ontology, epistemology, hermeneutics and methodology of intelligence occurs. Like Peter Gill, G.-C. Major does pioneering work to separate the ontological approach of intelligence from the epistemological one and to analyze the "epistemological foundation of intelligence" (Major G.-C., 2010, p 33 and p 43).

The intelligence must be also considered in terms of ontological axiom of the object. In this regard, noticeable is that one of its meanings, perhaps the critical one, places it in some way in the information area. In our opinion, the information that has critical significance for accredited operators of the state, economic, financial and political power, and holds or acquires confidential, secret feature is or becomes intelligence. Information from intelligence systems can be by itself intelligence or end up being intelligence after some specialized processing. "Intelligence is not just information that merely exists" (Marina M., Ivan I., 2010, p 108), Mariana Marinică and Ion Ivan assert, it is acquired after a "conscious act of creation, collection, analysis, interpretation and modeling information" (Marina M., Ivan I., 2010, p 105).

3.2. Teleological axiom. In addition to the axiom of segregating communication, of informing in relation to the object (message), it may be stated as an axiom a Magoroh Maruyama's contribution to the demythologization of information. In the article "Information and Communication in Poly Epistemological System" in "The Myths of Information", he states: „The transmission of information is not the purpose of communication. In Danish culture, for example, the purpose of communication is frequently to perpetuate the familiar, rather than to introduce new information" (1980, p. 29).

The ontological axiom of segregation in relation to the purpose determines information as that type of communication with low emergence in which the purpose of the interaction is transmitting information.

3.3. Linguistic axiom. A third axiom of communication-information ontological segregation can be drawn in relation to the linguistic argument of the acceptable grammatical context. Richard Varey considers that understanding "the difference between communication and information is the central factor" and finds in the linguistic context the criterion to validate the difference: „we speak of giving information **to** while communicate **with** other" (1997, p. 220). The transmission of information takes place "to" or to someone, and communication takes place "with". Along with this variant of grammatical context it might also emerge the situation of acceptability of some statements in relation to the object of the communication process, respectively the object of the information process.

The statement "to communicate a message, information" is acceptable. Instead, the statement "to inform communication" is not. The phrase "communication of messages-information" is valid, but the phrase "informing of

communication", is not. Therefore, language bears knowledge and "lead us" (Martin Heidegger states) to note that, linguistically, communication is more ontological extensive and that information ontology is subsumed to it.

The ontical and ontological nature of language allows it to express the existence and to achieve a functional-grammatical specification. Language allows only grammatical existences. As message, the information can be "communicated" or "communicable". There is also the case in which a piece of information can not be "communicated" or "communicable". Related, communication can not be "informed". The semantic field of communication is therefore larger, richer and more versatile. Communication allows the "incommunicable".

3.4. The neutrosophic communication axiom. Understanding the frame set by the three axioms, we find that some communicational elements are heterogeneous and neutral in relation to the criterion of informativity. In a speech some elements can be suppressed without the message suffering informational alterations. This means that some message-discursive meanings are redundant; others are not essential in relation to the orexis-the practical course or of practical touch in the order of reasoning. Redundancies and non-nuclear significational components can be elided and informational and the message remains informationally unchanged. This proves the existence of cores with neutral, neutrosophic meanings. (In the epistemological foundations of the concept of neutrosophy we refer to Florentin Smarandache's work, *A Unifying Field in Logics, Neutrosophic Logic, Neutrosophy, Neutrosophic Set, Neutrosophic Probability and Statistics*, 1998).

On the operation of this phenomenon are based the procedures of textual contraction, of grouping, of serial registration, of associating, summarizing, synthesizing, integrating.

We propose to understand by neutrosophic communication that type of communication in which the message consists of and it is based on neutrosophic significational elements: non-informational, redundant, elidable, contradictory, incomplete, vague, imprecise, contemplative, non-practical, of relational cultivation. Informational communication is that type of communication whose purpose is sharing an informational message. The issuer's fundamental approach is, in informational communication, to inform. To inform is to transmit information or, specifically, in the professor's Ilie Rad words: "to inform, that is just send information" (Moldovan L., 2011, p 70). In general, any communication contains some or certain neutrosophic elements, suppressible, redundant, elidable, non-nuclear elements. But when neutrosophic elements are prevailing communication is no longer informational, but neutrosophic. Therefore, the neutrosophic axiom allows us to distinguish two types of communication: neutrosophic communication and informational communication. In most of the time our communication is neutrosophic. The

neutrosophic communication is the rule. The informational communication is the exception. In the ocean of the neutrosophic communication, diamantine islands of informational communication are distinguished.

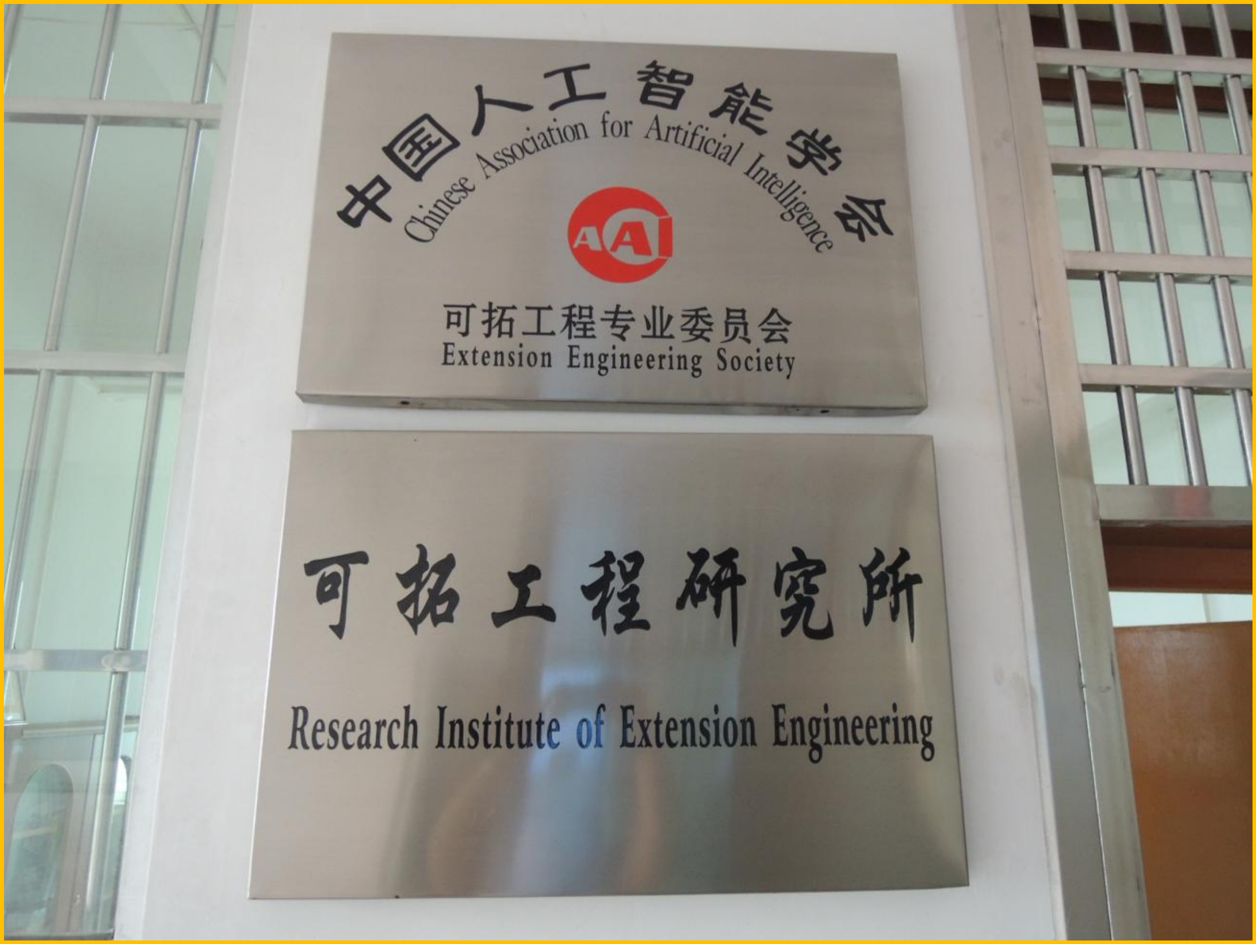
BIBLIOGRAPHY

1. Brier S., *What is a Possible Ontological and Epistemological Framework for a true Universal Information Science*, în Hofkirshner W. (ed.), *The Quest for a unified Theory of Information*, Amsterdam, Gordon and Breach Publishers, 1999.
2. Brillouin L., *Science and Information Theory*, 2nd edition, New York, Dober Publications Inc., 2004.
3. Cai Wen, *Extension Theory and its Application*, Chinese Science Bulletin, vol. 44, nr. 17, pp. 1538-1548, 1999.
4. Craia Sultana, *Dicţionar de comunicare, mass-media şi ştiinţa comunicării*, Bucureşti, Editura Meronia, 2008.
5. Dâncu V. S., *Comunicarea simbolică*, Cluj-Napoca, Editura Dacia, 1999.
6. DeVito, J. A., *Communicology*, New-York, Harper and Row, 1982.
7. DeVito J., *Messages*, Harper Collins College Publishers, 1993.
8. DeVito J., *Human Communication*, Addison Wesley Longman Inc., 2000.
9. Dobreanu Cristinel, *Preventing surprise at the strategic level,* Buletinul Universităţii Naţionale de Apărare „Carol I”, anul XX, nr. 1, pp. 225-233, 2010.
10. Duke S., Mc Mahan D.T., *The Basics of Communication*, London, Sage Publications Inc., 2011.
11. Enache Doru, *Informaţia, de la primul cal troian la cel de-al doilea cal troian*, Paraşutiştii, anul XIV, nr. 27(36), pp. 25-28, 2010.
12. Gelepithis P.A., *A rudimentary theory of information* în Hofkirshner W. (ed.), *The Quest for a unified Theory of Information*, Amsterdam, Gordon and Breach Publishers, 1999.
13. Gill P., Phytian S., *Intelligence in an insecure world*, Cambridge, Polity Press, 2006.
14. Gill P., Marrin S., Phytian S., *Intelligence Theory: Key questions and debates*, Routledge, New York, 2009.
15. Li Weihua, Yang Chunyan, *Extension Information-Knowledge-Strategy System for Semantic Interoperability,* Journal of Computers, vol. 3, no. 8, pp. 32-39, 2008.
16. Marinică M., Ivan I., *Intelligence – de la teorie către ştiinţă*, Revista Română de Studii de Intelligence, nr. 3, pp. 103-114, 2010.
17. Johnson L.K. (ed.), *The Oxford of Nnational Security Intelligence*, Oxford University Press, 2010.
18. Maior George Cristian, *Un război al minţii. Intelligence, servicii de informaţii şi cunoaştere strategică în secolul XXI*, Bucureşti, Editura

RAO, 2010.
19. Marinescu Valentina, *Introducere în teoria comunicării*, Bucureşti, Editura C. H. Beck, 2011.
20. Marcus Solomon, *Întâlniri cu /meetings with Solomon Marcus*, Bucureşti, Editura Spandugino, 2011, 2 volume.
21. Maruyama M., *Information and Communication in Poly-Epistemological Systems*, în Woodward K. (ed.), *The Myths of Information*, Routledge and Kegan Paul Ltd., 1980.
22. Métayer, G., *La Communicatique*, Paris, Les éditions d'organisation, 1972.
23. Miller G.A., *Language and communication*, New York, Mc-Graw-Hill, 1951.
24. Mokros H.B. şi Ruben B.D., *Understanding the Communication-Information Relationship: Levels of Information and Contexts of Availabilities*, Science Communication, June 1991, vol. 12, no. 4, pp. 373-388.
25. Moldovan L., *Indicii jurnalistice. Interviu cu prof. univ. dr. Ilie Rad* în Vatra veche, Serie nouă, Anul III, nr. 1(25), ianuarie 2011(ISSN2066-0962), pp. 67-71.
26. Newcomb TM, *An Approach to the study of communicative acts*, în Smith A.G. (ed), Communication and culture, New York, Holt, Rinehart and Winston, 1966.
27. Norton M., *Introductory concepts of Information Science*, Information Today, Inc., 2000.
28. Păvăloiu Catherine, *Elemente de deontologie a evaluării în contextul creşterii calităţii actului educaţional*, Forţele terestre, nr. 1/2010.
29. Petrescu Marius, Năbârjoiu Neculae *Managementul informaţiilor*, vol. I, Târgovişte, Editura Bibliotheca, 2006.
30. Petrescu Stan, *Despre intelligence. Spionaj-Contraspionaj*, Bucureşti, Editura Militară, 2007.
31. Petrescu Stan, *Informaţiile, a patra armă*, Bucureşti, Editura Militară, 1999.
32. Popa C., Ştefan Teodoru, Ivan Ion, *Măsuri organizatorice şi structuri funcţionale privind accesul la informaţii*, Bucureşti, Editura ANI, 2008.
33. Popescu C. F., *Manual de jurnalism*, Bucureşti, Editura Tritonic, 2004, 2 volume.
34. Rotaru Nicolae, *PSI-Comunicare*, Bucureşti, Editura A.N.I., 2007.
35. Ruben B.D, *The Communication-information relationship in System-theoretic perspective,* Journal of the American Society for Information Science, volume 43, issue 1, pp. 15-27, January 1992.
36. Ruben B.D., *Communication and human behavior*,New York, Prentice Hall, 1992.
37. Schement J.R., *Communication and information* în Schement J.R.,

Ruben B.D., *Information and Behavior*, volume 4, Between Communication and Information, Transaction Publishers, New Brunswick, New Jersey, 1993.

38. Shannon C., Weaver W., *The mathematical theory of communication*, Urbana, University of Illinois Press, 1949.
39. Sims J.E., Gerber B., *Transforming US Intelligence,* Washington D.C., Georgetown University Press, 2005.
40. Smarandache F., *A Unifying Field in Logics, Neutrosophic Logic, Neutrosophy, Neutrosophic Set, Neutrosophic Probability and Statistics*, American Research Press, Rehoboth, 1998.
41. Smarandache F., *Toward Dialectic Matter Element of Extenics Model*, sursă Internet, 2005.
42. Tran V., Stănciugelu I., *Teoria comunicării*, Bucureşti, comunicare.ro, 2003.
43. Vlăduţescu Ştefan, *Informaţia de la teorie către ştiinţă*, Bucureşti, Editura Didactică şi Pedagogică, 2002 (in romanian), *Information, from theory to science*.
44. Vlăduţescu Ştefan, *Comunicarea jurnalistică negativă*, Bucureşti, Editura Academiei Române, 2006 (in romanian), *Negative Journalistical Communication*.
45. Wiener N., *Cybernetics*, 3th ed., Mit Press, 1965.
46. Wilson T.D., *Trends and issues in information science*, în Boyd-Barrett O., Braham P., Media, Knowledge and Power, London, Croom Helm, 1987.
47. Wood J.T., *Communication in Our Lives*, Wadsworth/Cengage learning, 2009.
48. Zamfir G., *Comunicarea şi informaţia în sistemele de instruire asistată de calculator din domeniul economic*, Informatica Economică, nr. 7/1998, p. 7.



Prof. Florentin Smarandache, during his research period in the Summer of 2012 at the Research Institute of Extenics and Innovation Methods, from Guangdong University of Technology, in Guangzhou, China, has introduced the *Linear and Non-Linear Attraction Point Principle* and the *Network of Attraction Curves*, he has *generalized the 1D Extension Distance and the 1D Dependent Function to 2D, 3D, and in general to n-D Spaces*, and he generalized Qiao-Xing Li's and Xing-Sen Li's definitions of the *Location Value of a Point and the Dependent Function of a Point on a Single Finite Interval from one dimension (1D) to 2D, 3D, and in general n-D spaces*.

He used the Extenics, together with Victor Vlădăreanu, Mihai Liviu Smarandache, Tudor Păroiu, and Ştefan Vlăduţescu, in 2D and 3D spaces in technology, philosophy, and information theory.

Extenics is the science of solving contradictory problems in many fields set up by Prof. Cai Wen in 1983.

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